Constructing a protolanguage: Reconstructing prehistoric languages in a usage-based construction grammar framework

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Summary

Construction grammar is an approach to language which posits that units and structures in language can be exhaustively described as pairings between form and meaning. These pairings are called constructions and can have different degrees of abstraction, i.e. they span the entire range from very concrete (*Armadillo, avocado*) to very abstract constructions such as the ditransitive construction (*I gave her a book*). This approach has been applied to a wide variety of different areas of research in linguistics, such as how new constructions emerge and change historically. It has also been applied to investigate the evolutionary emergence of modern fully-fledged language, i.e. the question of how systems of constructions can arise out of prelinguistic communication. In this paper we review the contribution of usage-based Construction grammar approaches to language change and language evolution to the questions of a) the structure and nature of prehistoric languages and b) how constructions in prehistoric languages emerged out of non-linguistic or protolinguistic communication. In particular, we discuss the possibilities of using constructions as the main unit of analysis both in reconstructing predecessors of existing languages (protolanguages) and in formulating theories of how a potential predecessor of human language in general (protolanguage) must have looked like.

1. Introduction

In this paper, we discuss what a usage-based Construction Grammar (CxG) approach can contribute to the reconstruction of protolanguage(s). It should be stressed that the term protolanguage can have two different meanings: On the one hand, protolanguage can be used to refer to a “simpler than full language” [1] that is hypothesised to have been used in early hominin communication – we will refer to this as protolanguage1 (PL1). PL1 can basically be seen as the missing link between non-human animal communication systems and fully-fledged human language. On the other hand, in historical linguistics, protolanguage is commonly used to refer to an ancestral language which various related present-day languages have in common

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(protolanguage2, PL2) [2]. For example, Latin can be seen as a protolanguage that the Romance language family has in common as a shared ancestor [2].

From the point of view of traditional approaches to language evolution, these two notions refer to quite different concepts. But usage-based and emergentist approaches, including most approaches in a CxG framework, take a strongly gradualistic view on language and its development. On this view, the processes that lead from PL1 to fully-fledged human language are not fundamentally different from those that lead from ancestral PL2 (which are themselves already fully-fledged languages) to their respective daughter languages [3–6].

This paper builds on a number of interesting convergences that can be observed in current linguistics. For one thing, it has been pointed out that the boundaries between historical linguistics and language evolution research have become less strict in recent years than they used to be [7,8]. For another, CxG has become increasingly important in both fields. In historical linguistics, constructionist approaches have gained ground in accounts of individual language change phenomena [9–11] but also as a valuable tool for linguistic reconstruction [12,13]. And in language evolution research, various scholars have pointed out that CxG provides a promising framework for studying the evolution of language [5,14,15]. For example, the framework of Fluid Construction Grammar has proven highly successful in modelling the emergence and diachronic development of language using computer simulations [16]. We argue that combining these different strands of research can prove insightful in discussing language evolution scenarios and in generating scientifically informed hypotheses about protolanguage(s) in both senses of the word.

In Sections 2 to 6 of this paper, we discuss the potential of constructionist approaches for language evolution research from different perspectives. As a starting point, we outline the key assumptions of the usage-based CxG approach. We also introduce the complex adaptive systems approach to language that has become increasingly popular both in CxG and in language evolution research. According to this approach, language development takes place at several interrelated timescales – ontogenetic, diachronic-historical, enchronic-interactive, and phylogenetic. We argue that CxG approaches can make valuable contributions to theoretical and methodological advances at each of these four timescales. In particular, we focus on the diachronic timescale, reviewing previous work on the reconstruction of linguistic units in a CxG framework and discussing the implications of the theoretical underpinnings of usage-based CxG for scenarios of language emergence. In Section 7, we briefly summarise our main arguments and discuss some avenues for future research.

2. How to pair form and meaning: The origins of constructions across multiple timescales

CxG takes the position that units and structures in language can be exhaustively described as pairings between form and meaning [10,17–19]. These pairings are called constructions and can have different degrees of abstraction, from very concrete (e.g. word constructions such as *avocado*) to very abstract constructions such as the ditransitive construction (*I gave her a book*). The central unit of explanation from a constructionist perspective for both PL1 and PL2, then, is the emergence of form-meaning pairs with differing degrees of schematicity and complexity. While there are several quite different approaches to the analysis of linguistic constructions in this sense [20], we will focus exclusively on usage-based CxG, which is closely related to other frameworks such as Emergent Grammar or several strands of Cognitive Linguistics [21].

Usage-based CxG adopts an emergentist framework of seeing language as a complex adaptive system emerging out of dynamic interactions of factors on multiple timescales [22,23]. From a usage-based and constructionist point of view, then, the *processes* that are involved in all aspects of the dynamics of the emergence of constructions (acquisition, variation, change) should be put center stage in the endeavour of reconstructing prehistoric languages. This holds regardless of whether we want to reconstruct concrete languages or gather evidence on how a predecessor of fully-fledged language may have looked like. What distinguishes usage-based CxG from most other usage-based and emergentist approaches is its focus on constructions as the main unit of analysis, which, as we will argue below, can prove helpful in reconstructing prehistoric languages. Note, however, that it is in principle possible to view the concept of a construction as a mainly heuristic device, rather than positing that constructions are cognitively real(istic) entities. This means that this approach is, in principle, also compatible with views that treat abstractions as made of exemplars [24,25] or association-based models eschewing the concept of constructions [26].

In this paper, we focus on four different but interrelated timescales that are especially relevant to the emergence of linguistic form-meaning pairs [23,27,28]:

(a) the ontogenetic timescale: Constructions emerge over the course of language acquisition [29]. The timescale for ontogenetic change covers the entire biography of an individual.

(b) the diachronic, cultural-historical timescale, sometimes also called the ‘glossogenetic’ timescale [23,30]: New form-meaning pairings emerge and become conventionalised within a population over historical time [3,10].

(c) the interactional, or “enchronic” timescale [28]: Constructions also emerge through social interactive processes operating in conversational time.

(d) the phylogenetic timescale: In the course of the biological evolution of the human lineage, the human brain has become “language-ready”. That is, it has become able to support the emergence and structured storage of a massive amount of form-meaning pairings, along with the social processes involved in this [5,14,31].

Phylogenetic change usually refers to changes that happen across hundreds of millennia but biological changes have also been observed across a generational timescale [32].

Uncovering the processes and mechanisms that operate over these different timescales can elucidate processes that are also relevant to the nature of prehistoric languages (PL2) as well as PL1. In the remainder of this section, we will discuss these timescales in turn. Our main focus, however, will be on the diachronic timescale.

3. The ontogenetic timescale

From a usage-based, constructionist point of view, children use their sociocognitive abilities as well as their general cognitive abilities, including pattern-finding and statistical learning [33], to form abstractions over instances of language use. That is, they form associations between meanings, forms, and patterns in language use, thereby acquiring constructions. They then generalize these items to increasingly abstract constructional schemas [29]. Through frequent use and exposure, such constructions become increasingly entrenched. Children recognise similarities and connections between constructions through analogy [34]. Processes of association, chunking, routinisation, schematisation and automation lead to frequently occurring form-meaning-pairs being stored and represented in memory in the form of a constructional network, or ‘constructicon’ [18,35–37].

Looking at the cognitive mechanisms and processes involved in the emergence of constructions on the ontogenetic timescale can give important clues to cognitive factors that shape language structure. For example, there is growing consensus that language structure adapts to pressures of learnability, more specifically: to being learnable by infants [38,39]. For example, Christiansen & Chater [39] mention the minimisation of memory load and regularity as potential pressures that follow from domain-general processing constraints. However, it can be expected that these pressures were weaker in the initial stages of PL1 but quickly became more important as linguistic communication, which crucially relies on cultural transmission, became the key mode of human interaction. In general, however, the ontogenetic perspective suggests that prehistoric languages consisted of schematised, entrenched form-meaning pairings stored in association networks in memory. Just as with modern constructicons, prehistoric languages would also have featured a significant amount of less schematised form-meaning pairings, such as specific lexical items (*wheel*), as well as partially filled (*the x-er, the y-er*) and non-compositional constructions (*kick the bucket*) [17,18,37]. Importantly, this view holds for both PL1 and PL2, as we assume that the differences between them are gradual. The main distinction between them consists in the higher degree of interrelatedness and complexity as well as a larger number of more abstract and schematised constructions in PL2 constructicons compared to PL1 constructicons.

4. The diachronic timescale

The diachronic timescale is concerned with how new grammatical forms and constructions emerge out of old forms. For example, the English *going to* future construction emerged from a pattern that originally was fully compositional (e.g. *I’m going to the library > I’m going to stay here*) [40]. Such historical changes are referred to as grammaticalisation [41]. In a constructionist perspective the focus lies on how such changes lead to the emergence of new constructions, or “the creation of form_{new}-meaning_{new} (combinations of) signs.” ([10] p. 22). For this reason, this process is often called “constructionalization” [10]. Research on the processes involved in

the emergence of constructions have uncovered a host of mechanisms and factors that are operative when new associations between forms and meanings emerge. Many of these are also operative when children learn language, including e.g. frequency, salience, analogy, and priming [34,42]. Others seem to play an especially important role in language change, specifically. These include metaphor and metonymy (see Benítez-Burraco & Progovac, this volume, and Gil & Shen, this volume), the extension and bleaching of meanings, as well as pragmatic inference [3,4,10,43].

From a constructionist perspective, these mechanisms are part of what characterises the “language-ready”, or “construction-ready”, brain. First, there is evidence that basic analogical cognition is prior to language [44,45]. In addition, there is also some evidence that analogical abilities are present in non-human animals. For example, chimpanzees are capable of understanding simple relational similarities [46]. This suggests that basic analogical capabilities were present at the emergence of PL1, and then acted on PL1 over historical time, leading to the emergence of PL2(s) through processes of constructionalization [3,4,6,33,47]. However, this does not necessarily preclude the possibility of the “PL1-ready brain” having undergone further subtle cognitive and neurological changes in the course of recent human history [48], for example in the domains of analogy and social cognition. In fact, many researchers assume a co-evolutionary process in which the initial stages of (proto-)language have a fundamental impact on subsequent brain evolution. For instance, Deacon proposes that symbolic reference is the uniquely human semiotic core of language, giving rise to a co-evolved complex of adaptations that allowed for the evolution of ever greater language complexity [38]. This view is also compatible with recent approaches in language evolution research that emphasise human self-domestication. For example, Benítez-Burraco & Progovac present evidence in favor of the hypothesis that the first anatomically modern humans were not fully cognitively modern and that advanced cognitive capabilities only emerged gradually with the development of our distinctive globular skull and brain [49]. In addition, it is also important to note that during development, different cognitive skills scaffold each other through dynamic feedback loops [50]. For example, the possession of a symbol system and the use of either PL1 or PL2 likely amplifies analogical and other cognitive abilities in a mutual bootstrapping relationship during development [51,52].

(a) Putting “construction” into reconstruction: Construction Grammar and the comparative method

Linguistic reconstruction is a cornerstone of historical linguistics and linguistic typology [2,53]. Much of what we know about family relationships between the world’s languages was established with the help of the comparative method, which goes back to the 19th-century Neogrammarian tradition.[13,54] This method “compares forms from related languages, *cognates*, which have descended from a common ancestral language (the *proto-language*), in order to postulate, that is to *reconstruct*, the form in the ancestral language” [53]. In order to establish the status of potentially related forms as cognates, the comparative method primarily relies on the detection of sound correspondences on the basis of systematic principles as well as a number of guiding assumptions [2,53,55], including the often-cited assumption that sound change suffers no exceptions [53,56]. In recent decades, basic principles of the comparative method have also been adapted in large-scale quantitative approaches [57,58] that have, however, been heavily criticised by traditional historical linguists [53,59]. While the classic comparative method, which is based on careful manual analysis, conveys the impression of scientific accuracy, large-scale quantitative approaches share the problem of many “big data” analyses in that they tend to trade accuracy for large quantities of data. However, it is exactly these large quantities of data that can open up new perspectives on long-standing questions, which is why ultimately, both large-scale and small-scale analyses are needed. Importantly, the constructionist perspective sketched in this section allows for both perspectives, at least in principle – in practice, large-scale quantitative approaches would require much preparatory work regarding the documentation of constructional inventories, which is currently still in its initial stages.

Despite the success of the comparative method, there are also important limitations. As already pointed out by Meillet in 1925, comparative reconstructions can only be approximations of the actual protolanguage [60]. In recent research, some of the foundational assumptions of the method have also been questioned. For example, it has been pointed out that “[t]he regularity of the sound laws [...] is grossly overstated” [13]. Also, the scope of the comparative method is usually limited to lexical, morphological, and phonological comparisons, while syntactic reconstruction was neglected or in some cases even deemed impossible[13]. This is where CxG enters the picture.

As e.g. Barðdal and colleagues have argued, constructionist approaches to language provide helpful conceptual tools for reconstructing linguistic units above the word level[12,13,61,62]. As the comparative method is based on form-meaning correspondences on the level of lexical items, it can easily be extended to e.g. syntactic patterns from a constructionist perspective, which views patterns above the word level as form-meaning pairs as well[63].

Using a constructionist approach, correspondence sets can be established on the basis of form-meaning pairings that can be found in related languages. As mentioned above, a constructicon is the network of constructions that constitutes a speaker's knowledge of language – or, at a population level, an abstraction over the shared inventories of many individual language users. The goal of a constructionist approach to linguistic reconstruction is to reconstruct as much as possible of a “proto-constructicon”, i.e. the inventory of form-meaning pairs that constitutes an ancestral language (PL2).

Importantly, this perspective extends the scope of the comparative method to the reconstruction of grammars, rather than just forms. This opens up possibilities for syntactic reconstruction. To this end, lower-level constructions in extant languages of a particular language family are determined in a first step. On this basis, possible correspondence sets can be determined. For example, Barðdal et al. [63] investigate syntactic constructions with cognates of English *wee* across five sub-branches of Indo-European. If many different constructions are reconstructed in this way, a “proto-constructicon” can be posited. This process can be applied iteratively, which allows for reconstructing multiple “layers” of protolanguages, as shown in Figure 1.

Fig. 1: Iterative reconstruction of proto-constructions and proto-constructicons, based on Barðdal & Eythórsson[12].

An obvious challenge is of course that the reconstruction of grammars as proposed by Barðdal and colleagues “presupposes that the constructions and the Constructicons of the modern languages [...] be identified and modeled”[62]. But modelling the entire constructicon of even just one single language is a nearly impossible task. On the one hand, this is because of the sheer vastness of form-meaning pairings of different degrees of schematicity.[18] On the other hand, it is also because modeling constructicons depends on the underlying definition and operationalisation of constructions[64]. But just as the classic comparative method does not compare all lexical items in all languages under investigation, the scope of the reconstruction can, in principle, be limited to specific families of constructions.

(b) Goals and extensions of Construction Grammar approaches to linguistic reconstruction

As in the case of the classic comparative method, the ultimate goal can hardly be to reconstruct an actual language in its entirety. Instead, one major goal is to develop and test hypotheses about language structure and language change. As for the former, linguistic reconstruction can help explain how linguistic diversity comes about and how it may be constrained. In other words, using a widely-discussed term [65], it can help detect language universals [66]. Regarding language change, linguistic reconstruction can help unravel the complex patterns of replication, selection and adaptation that lead to the emergence, change, and loss of linguistic constructions and ultimately to the reconfiguration of entire constructions. In the long run such reconfigurations can be so drastic that the resulting inventory of constructions is described as a new language [67]. This is also where current and future approaches to linguistic reconstruction can go beyond the classic comparative method. We can take all sorts of evidence into account that was unavailable to researchers working on linguistic reconstruction until recently. For example, there is ample evidence from experimental approaches as well as computational modelling that social, interactional, and other contextual pressures shape the structure of languages [68–71]. In principle, this allows for reconstructions that are informed by what we know about the non-linguistic from other domains, even though the question of how exactly this additional information can be used for reconstruction remains a major challenge. At the same time, given what we know about language variation and about individual differences in language use [72], we may also be able to question the assumption that there is always one single “correct” reconstruction and instead aim at reconstructing patterns of variation as well.

5. The enchronic timescale

Processes and mechanisms on the enchronic timescale also play a crucial role when investigating the emergence of constructions. On this timescale, the focus lies on “the emergence of grammatical patterning in on-line production, dialogically, and as a cooperative achievement” [73] (p.1756). Constructions, on this timescale, are therefore a fundamentally ‘emergent’ phenomenon influenced by and realised in social interaction [74,75]. This means that if we want to elucidate the possible structure of prehistoric languages (in the sense of both PL1 and PL2), we need to take into account the online, in-vivo interactional emergence of constructions and their subsequent conventionalization as well as the mechanisms and processes involved in this [6]. From a usage-based CxG perspective, these involve many of the same processes that also operate at different timescales, such as language acquisition and diachronic language change. But they also involve mechanisms specific to the enchronic timescale. For a characterisation of a “language-ready” or “construction-ready” brain, we therefore not only have to focus on the processes and mechanisms that enable children to learn language and those that lead to the diachronic development of new constructions. We also have to add those that are implicated in the emergence of constructions in “conversational time.” These include routinisation, schematisation and entrenchment on the local level [76], which represent processes and mechanisms that also operate on other timescales on a more global level. But they also include specifically enchronic-interactional processes such as repair [77,78] and other alignment processes [79].

In interaction, interlocutors verbalise and share their experiences and perspectives. By doing so, they introduce variation, which can then become the target of schematisation when specific patterns of verbalisation are repeated, leading to the emergence of temporary constructions [74,80]. Such temporary constructions can be seen as referential or conceptual pacts that interlocutors converge on when negotiating shared perspectives. They also represent adaptations to specific usage contexts and specific social and environmental conditions [69,81–83]. Examples of such temporary constructions can be found in everyday discourse, e.g. when interlocutors align on a common word for a specific referent, but also in situations in which interlocutors cannot rely on a common language or communication system, e.g. in experimental setups [84] or in situations of language contact ([14] p.445).

In the case of frequently recurring routines and practices, temporary constructions that are frequently micro-entrenched – i.e. entrenched on a local, short-term level – gradually acquire increasing degrees of entrenchment and conventionalization [26,85]. Over time, this leads to these constructions emerging more easily and more frequently in interactions. This process leads to them turning into structured,

conventionalized constructions proper through processes of grammaticalization and constructionalization [3,10,22]. As these processes represent general mechanisms of cognition, learning, and interaction, we propose that they form part of the “language-ready brain” and the “construction-ready brain.” This view is consistent with the perspective that language structure is influenced to a significant degree by interactional and processing mechanisms and constraints [22,86].

Mechanisms at the enchronic timescale and their diachronic effects are also a crucial factor in the development of languages that have played a crucial role in language evolution research: so-called creole languages that have their origin in language contact situations as well as emerging sign languages and sign languages used in relatively small communities [87,88]. However, there is an increasing awareness that this line of research partly rests on problematic assumptions and implicit ideologies such as the notion of “creole exceptionalism” [89] or the conceptualisation of emergent sign languages as “immature” languages [90]. Taking the enchronic perspective seriously can help overcome such problematic framings, as differences in language structure are accounted for by taking the interactional and social context into account, rather than (implicitly or explicitly) evaluating the languages under investigation in comparison to other languages with a longer history.

Guarding against such problematic assumptions is all the more important as historically, theorising on the evolution of language has close connections to colonialist perspectives. Such perspectives were characterised by the dehumanizing “belief that ‘primitive’ peoples speak ‘primitive’ languages and that ‘evolved’ people speak ‘evolved’ languages” [91]. The gradualist view taken here, however, is highly compatible with the assumption that “if there is one central difference between language change and creolization, it is at best a *sociohistorical* one” [91]. In other words, the same mechanisms are involved in the emergence of creoles, as well as the emergence of new sign languages, that also lead to historical language change and the emergence of “new” languages from existing ones (such as French, Spanish etc. from their PL2 Latin).

The operations at the enchronic level mentioned above are in part responsible for the emergence of (proto)constructions in both PL1 and PL2. Specifically, on this view, temporary, emergent communicative routines turned into an inventory of entrenched community-wide communicative routines – PL1 –, which then evolved into a fully grammaticalized and conventionalized structured inventory of constructions shared by a community – the first prehistoric protolanguages in the sense of PL2. Of course, it is important to note here that enchronic phenomena not only require a “language-, interaction-, and construction-ready brain.” In addition, this perspective also directs attention to the “language-ready social settings” [92], the “embodied interactions between social actors in meaningful ecologies” [93] and factors such as being situated, embedded and enculturated in particular social and interactional environments, which are central to usage-based approaches [22,94]

6. The phylogenetic timescale

On the view presented here, PL1 represents “a culmination of ad-hoc ostensive acts whose meanings were inferred from context, memorised and subsequently entrenched through repeated use” [33]. This, then, forms the starting point of the development of prehistoric languages through processes of constructionalization and its associated mechanisms. From an evolutionary perspective, this also has important implications for the nature of PL1.

Regarding the characterisation of the early, temporary, emergent proto-constructional templates characterising the beginnings of PL1, it is important to note that these should not be seen as form-meaning pairings in the same way as fully-fledged linguistic constructions. Instead, they are more like pairings of a form with a range of meaning potentials in which communicative routines still have a high degree of semantic ambiguity and openness. In order to function as communicative units within an interaction, they are still heavily reliant on context. This semantic openness, or underspecification, therefore would also have characterised prehistoric languages [95]; see also Gil this volume). Evolutionary foundations of these features can be found in the gesture systems of non-human primates, whose meaning and function is heavily context-dependent and underspecified [96,97]. They can also be found in the communication system of non-human animals more generally, which have also been shown to be much more context-dependent, and reliant on pragmatic factors than previously believed [98,99]. However, early prehistoric languages would have been much more semantically and expressively powerful, as they were based on much more powerful capacities for metacognition, advanced sociocognitive capacities and perspective-taking [95,100]. In addition, they were also

embedded in much more complex social structures and interaction patterns, properties that continue to shape language structure [101,102].

One very specific hypothesis about the nature of prehistoric languages arises from this perspective is the following: polysemy would already have been a feature of the earliest prehistoric languages. In addition, instead of being only gestural or only vocal, protolanguage₁ was very likely multimodal in nature ([103–105], Żywiczyński, this volume). This assumption is consistent with research on multimodal processing in human communication [106,107], and can also be captured in a CxG framework [108,109]. Current approaches in a CxG framework see language as a multimodal phenomenon and have also started to describe constructions in multimodal terms. This perspective also links up nicely with various lines of research in cognitive science, e.g. frameworks emphasising embodiment and enactivism, which sees action as constitutive of perception and cognition [110]. Given that multimodal CxG sees multimodal constructions as a central component of modern fully-fledged languages, this perspective in fact predicts that PL1 and PL2(s) were also multimodal in nature. In a CxG framework, there are two additional foundational capacities for the evolution of PL1 and its elaborations in PL2. The first is the importance of iconicity in language structure and acquisition [111,112], which has also been suggested to play an important role in the emergence of protolinguistic forms of communication, especially in the gestural domain [105,113–115]. Interestingly, great apes seem not to be able to spontaneously comprehend iconic gestures [116,117]. However, over time they learn iconic gestures faster than arbitrary ones [117], and there are some occurrences of iconic gestures in the wild [118]. This suggests that the beginnings of an understanding of iconicity are already present in great apes. From a phylogenetic perspective, therefore, the evolution of the comprehension of iconicity represents a key evolutionary foundation for the evolution of PL1 and further shaped the structure of prehistoric languages (PL2). The second capacity is the ability to organise items in a structured, hierarchical, connected network structure with different links, which is the key foundation of the construction [56]. Although there seem to be beginnings of the capacity to acquire simple structured networks in non-human primates [38], especially in the social domain [119], the human capacity for the “massive storage” [14] of constructions in a structured network is likely a specifically human evolutionary development that represents the evolutionary platform for the emergence of the human construction [21].

7. Conclusion

In this paper, we have discussed which contributions Construction Grammar can make to research on the evolution of language. We have focussed on four interrelated timescales that have been proposed in recent approaches to evolutionary linguistics, with special attention on the diachronic one. We have argued that the reconstruction of constructions and networks of constructions has the potential to unveil broader aspects of prehistoric languages. It allows for systematic reconstruction above the level of phonemes and lexical units, which have been the main focus of the traditional comparative method. By focussing on the mechanisms and processes involved in the emergence of constructions on the ontogenetic, diachronic, enchronic and phylogenetic timescales, this approach can help elucidate the dynamics that led to the gradual cultural evolution of prehistoric languages (PL2) out of PL1. In addition, it can also provide insights into some of the general features of protolanguage and early prehistoric languages, such as semantic promiscuity/polysemy and multimodality, as well as the cognitive and interactional mechanisms involved in the emergence and change of constructions.

However, it is also important to note that this approach still faces a number of limitations. For instance, attempts to systematically reconstruct protolanguage stages from a CxG point of view at present are still very much in their initial stages and are therefore still quite general [5,15]. This holds especially in comparison to the classic work on linguistic reconstruction using the traditional comparative method or detailed proposals in formalist frameworks such as that of Progovac [120] (see also Benítez-Burraco and Progovac, this volume) or those rooted in grammaticalization theory such as that of Heine and Kuteva [3].

Importantly, however, these different approaches are not mutually exclusive but rather complementary. More than many other fields, language evolution research has always relied on converging evidence from multiple sources and disciplines, and as outlined in the introduction, the principle of seeking converging evidence has become even more important across various disciplines in recent years and decades. Constructionist approaches can arguably add various important parts to the “jigsaw puzzle” of linguistic reconstruction, especially when it comes to delineating the processes and mechanisms involved in the emergence and change of linguistic constructions, and when it comes to the reconstruction of patterns above the word level. One

important goal for future research that would strengthen this approach is that construction grammarians need to propose more such higher-order constructional reconstructions to demonstrate the feasibility of this approach. In addition, the claim that enchronic factors and their repetition over time lead to the emergence of conventionalised, structured constructions lends itself to experimental validation in laboratory settings combining mechanisms of interaction and cultural transmission. Whereas previous research has shown that signals develop language-like properties in such settings [121], a usage-based CxG perspective also makes the testable prediction that enchronic effects should also be able to lead to the emergence of more schematic patterns that can be captured in terms of constructions.

Even though CxG is conceived as a “catch-all” approach to language in the sense that it is assumed that language can be exhaustively described in terms of form-meaning pairs, we do not argue that a constructionist approach to linguistic reconstruction makes other approaches obsolete. Quite on the contrary – especially in recent years, there has been an increasing awareness that language can only be understood from a thoroughly interdisciplinary point of view. Thus, different approaches to linguistic reconstruction cannot only complement each other but should also be complemented by evidence from other disciplines such as neuroscience, genetics, archaeology, and many others (see also Dediu, this volume, Nichols, this volume). The main added value of a constructionist perspective is that it provides a unified formalism for describing (and reconstructing) linguistic units at different levels of abstraction while at the same time being underpinned by a solid and empirically well-supported theoretical framework spanning multiple timescales that has many important implications for processes of language development and can therefore also prove highly insightful in linguistic reconstruction.

Acknowledgments

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