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Evolutionary Syntax



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LJILJANA PROGOVAC

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To Ana and Stefan

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Co-authored with Noa Ofen

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Preface

This monograph is meant to be readable and evaluable not only by linguists—all kinds of linguists—but also by non-linguists. To this end, painful efforts have been made to write it clearly, and to present the theories and postulates it draws upon in an accessible way, without taking away too much from the complexity of the issues discussed. This is especially important to do in a monograph which purports to stimulate interdisciplinary projects on language evolution. The footnotes are used to do justice to some of the complexities, and they include some technical details of the analysis. The reader who ignores the footnotes will still get the gist of the arguments. However, the reader will only fully grasp the impact of this proposal after working through at least Chapter 4, which brings it all together. Each of the Chapters 2, 3, and 4 considers the proposed proto-syntax stages from a different angle, and it is only after all these angles are taken into account that a clear picture will emerge.

This monograph draws directly upon the field of theoretical syntax, and presents some of its key postulates in an accessible way so that crossfertilization can be sought between this field and the fields of evolutionary biology, neuroscience, and genetics. In addition, this monograph sometimes takes into account the linguistic (sub-) disciplines such as typology and theories of grammaticalization. Doing an interdisciplinary study of this kind inevitably leads to some loss of detail with each particular field, but my assessment is that any such loss is more than compensated for by the synergy among these fields, yielding insights that would never be possible without this kind of approach.

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My immense gratitude goes to the two Oxford University Press reviewers, for providing amazingly thorough and stimulating comments, as well as to editor Maggie Tallerman, for many thoughtful and detailed comments. Their comments made me produce a more nuanced, more engaged, and more informed monograph. My deep gratitude also goes to the Oxford University Press editor, Julia Steer, for her thoughtfulness.

The ideas pursued in this monograph have been presented at various conferences and workshops, which were crucial in shaping my proposal on the evolution of language, and I am grateful to the audiences there for their valuable feedback: Slavic Linguistic Society (2006); Michigan Linguistic Society (2006, 2007); Georgetown University Round Table (*GURT*) (2007); International Linguistics Association (*ILA*), New York (2007); Max Planck Workshop on Complexity, Leipzig, Germany (2007); Illinois State University Conference on Recursion in Human Language (2007); Formal Approaches to Slavic Linguistics (*FASL*) (2007, 2008, 2012, 2014); American Association of Teachers of Slavic and East European Languages (*AAT-SEEL*), Chicago (2007); DGfS Workshop on Language Universals in Bamberg, Germany (2008); EvoLang in Barcelona, Spain (2008); Biolinguistics: Acquisition and Language Evolution (*BALE*) in York, England (2008); Generative Syntax Workshop, Novi Sad, Serbia (2008); Ways to Protolanguage Workshop, Torún, Poland (2009); EvoLang, Utrecht, Netherlands (2010); SyntaxFest, Bloomington, Indiana (2010); Workshop on Protolanguage, University of Virginia, Charlottesville (2012); Symposium on Formal Linguistics and the Measurement of Grammatical Complexity, Seattle, Washington (2012); Transcending the Boundaries Workshop, Duke Institute for Brain Sciences (2013); University of Connecticut Workshop on the Evolution of Syntax, Storrs, Connecticut (2014).

Needless to say, I have not always heeded the advice, and whether I did or not, all errors remain mine.

List of abbreviations

| | |
|-------|------------------------------------|
| 1,2,3 | First, Second, or Third Person |
| ABSL | Al-Sayyid Bedouin Sign Language |
| ACC | Accusative |
| BP | Before Present |
| CP | Complementizer Phrase |
| DOM | Differential Object Marking |
| DP | Determiner Phrase |
| ECM | Exceptional Case Marking |
| F | Feminine (gender) |
| IE | Indo-European |
| IFG | Inferior frontal gyrus |
| IMP | Imperative |
| INF | Infinitive |
| M | Masculine (gender) |
| N | Neuter (gender) |
| mya | Million years ago |
| NOM | Nominative |
| NP | Noun Phrase |
| NSL | Nicaraguan Sign Language |
| PART | Participle |
| PERF | Perfective |
| PIE | Proto-Indo-European |
| PL | Plural |
| PRES | Present |
| pSTS | Posterior superior temporal sulcus |
| SC | Small Clause |
| SG | Singular |
| SOV | Subject-Object-Verb |
| SVO | Subject-Verb-Object |

| | |
|-----|-------------------|
| TAM | Tense/Aspect/Mood |
| TP | Tense Phrase |
| VN | Verb-noun |
| VP | Verb Phrase |
| vP | Light Verb Phrase |

“The sensations and ideas thus excited in us by music, or expressed by the cadences of oratory, appear, from their vagueness, yet depth, like mental reversions to the emotions and thought of a long-past age.”

(Darwin 1874: 595)

Introduction

1.1 Background and rationale

Broadly speaking, the goal of this monograph is to provide a framework, a program for studying the evolution of syntax, by relying on a theory of syntax. The intent is to show that syntax can be decomposed into evolutionary primitives/layers, and that such decomposition can not only help identify the stages of evolutionary progression of syntax, but also shed light on the very nature of language design. I also show that the progression through the postulated stages makes evolutionary sense, i.e., that each new stage brings some concrete advantage(s) over the previous stage(s), and that such advantage(s) would have been subject to natural/sexual selection.¹ My proposal is therefore that the capacity for syntax evolved incrementally, in stages, subject to selection pressures.² This approach leaves the door wide open for the possibility that the pressures to evolve syntax, and language in general, played an active role in shaping human brains, contrasting with the view that the brain's capabilities evolved for some other purpose, and then got co-opted for language.

This monograph draws on and brings together: (i) Darwin's (1859, 1872, 1874) theory of gradualist evolution invoking natural/sexual selection; (ii) some key syntactic postulates of the Minimalist Program for syntax (e.g. Chomsky 1995) and its predecessors; (iii) Jackendoff's (1999, 2002) idea of syntactic "fossils;" and (iv) the

¹ While sexual selection is typically considered to be a subclass of natural selection, given that they both ultimately reduce to reproduction, I sometimes use both terms in this book next to each other in order to highlight the prominent role sexual selection might have played in language evolution. As I will argue, at least some aspects of the evolution of syntax/language may not have been adaptive in the sense of physical survival in the environment, but instead beneficial for securing mates.

² When I refer to the gradual evolution of syntax in this monograph, this can also be interpreted as the gradual evolution of the *capacity* to use syntax, one aspect of which is the capacity to establish numerous neural connections in the brain, as discussed in Section 1.4. But my primary intent here is to hypothesize what kind of syntax/grammar was actually in use in each proposed stage, whether the use of simpler grammars at these stages reflected the lesser capacity for establishing a multitude of neural connections necessary to support more complex syntax, or whether the use of simpler syntax simply reflected the lack of innovation (of more complex syntactic structures) at that point, or both.

idea of internal reconstruction using a linguistic theory (Heine and Kuteva 2007).³ The proposed framework is not only informed by syntactic theory, but it is also consistent with the forces of natural/sexual selection and it is specific enough to yield testable hypotheses that can be subjected to e.g. neuroimaging experiments. Remarkably, by reconstructing a particular path along which syntax evolved, this approach is able to explain the crucial properties of language design itself, as well as some major parameters of crosslinguistic variation.⁴

In the spirit of Darwin (e.g. 1859), and as elaborated in Jacob (1977), evolution is to be seen as a “tinkerer,” rather than an engineer. Unlike engineering, which designs from scratch, with foresight and plan, and with perfection, tinkering works by cobbling something together out of bits and pieces that happen to be available locally, with no long-term foresight. Evolution is also known to be conservative and not to throw a good thing away, but to build upon it, which is why one should expect to find constructions of previous stages (“fossils”) in the later stages. One of the themes of this monograph is that the advent of a new stage does not obliterate the previous stage(s), but rather that the older stages continue to co-exist, often in specialized or marginalized roles, in addition to being built into the very foundation of more complex structures.

However, many syntacticians believe that it is inconceivable for there to exist, or to have ever existed, a human language which does not come complete with unbounded Merge, Move, structural case, subordination, and a series of functional projections: the hallmarks of modern syntax. The claim is often that syntax in its entirety evolved suddenly, as a result of a single event. The following quotation from Berwick (1998: 338–9) summarizes this view: “In this sense, there is no possibility of an ‘intermediate’ *syntax* between a non-combinatorial one and full natural language—one either has Merge in all its generative glory, or one has no combinatorial syntax at all . . .” (see also Chomsky 2002, 2005; Piattelli-Palmarini 2010; Moro 2008). When it comes to language evolution, this stance has been challenged by e.g. Pinker and Bloom (1990); Newmeyer (1991, 1998, 2005); Jackendoff (1999, 2002); Culicover and Jackendoff (2005); Givón (e.g. 2002a,b, 2009); Tallerman (2007, 2013a,b, 2014a,b); Heine and Kuteva (2007); Hurford (2007, 2012); Progovic (2006, 2009a, b, 2013b).⁵ Most recently,

³ This may appear to be an uneasy alliance, especially given that Noam Chomsky himself has rejected a gradualist approach to the evolution of syntax, as discussed below in the text (in this respect, see Clark 2013 for the argument that one’s theoretical framework does not determine one’s stand on language evolution). To my mind, a syntactic program such as Minimalism is not the truth about language, but it is a framework which provides tools that can be used to search for the truth (see Section 1.7). The tools of other approaches can certainly be used as well.

⁴ As put in Givón (2002b: 39), “like other biological phenomena, language cannot be fully understood without reference to its evolution, *whether proven or hypothesized*.” An even stronger claim to this effect can be found in Dobzhansky’s (1973) article titled “Nothing in biology makes sense except in the light of evolution.”

⁵ For a thorough overview of the recent approaches to language evolution, the reader is referred to the introductory chapter of Heine and Kuteva (2007), as well as to Tallerman and Gibson (2012).

on the other hand, Berwick and Chomsky (2011: 29–31) assert again that “the simplest assumption, hence the one we adopt . . . , is that the generative procedure emerged suddenly as the result of a minor mutation. In that case we would expect the generative procedure to be very simple . . . The generative process is optimal. . . Language is something like a snowflake, assuming its particular form by virtue of laws of nature . . . Optimally, recursion can be reduced to Merge . . . ⁶ There is no room in this picture for any precursors to language—say a language-like system with only short sentences. The same holds for language acquisition, despite appearances . . . ”⁷

This monograph shows that there is in fact ample room for a language system with short (and flat) sentences, and that such constructs are not just something we can postulate for the evolution of syntax, but that they are also found as “living fossils” throughout present-day languages (see e.g. Jackendoff 1999, 2002 for the idea of living fossils of syntax). In biological literature, living fossils are defined as species that have changed little from their fossil ancestors in the distant past, e.g. lungfish (Ridley 1993).⁸ Significantly, such fossil structures in syntax are clearly characterizable using the tools of Minimalism, and their properties follow precisely from the reconstruction formula introduced in the following section. For something to qualify as a syntactic fossil, I argue, it has to be theoretically proven to be measurably simpler than its more complex/more modern counterparts, and yet show clear continuity with them. Strikingly, there is evidence that these (proto-syntactic) fossils provide a foundation upon which more complex syntactic structures are built.

Jackendoff (1999, 2002) considers paratactic grammars as evolutionarily more primary than hierarchical grammars, and identifies some fossils of such grammars, including compounds and adjunction processes (see Section 1.6 for more details regarding Jackendoff’s approach). Parataxis can be considered as a loose combination or concatenation of two or more elements. Jackendoff’s claim is that the achievements of the previous stages are still there, co-existing side by side with more complex hierarchical constructions. This monograph shows that one can make an even stronger and more specific claim than this, which is that these paratactic (fossil) structures are built into the very foundation of every modern clause

⁶ This idea that syntax is optimal in some sense can be found in various recent papers on Minimalism. According to the so-called Strong Minimalist Thesis (SMT), language is an optimal solution to legibility conditions (e.g. Chomsky 2000: 96; see also Epstein, Kitahara, and Seely 2010). However, what “optimal” should mean in this context has not been defined, and this makes it impossible to falsify these claims, or to respond to them in a meaningful way (see also the discussion in Johnson and Lappin 1999).

⁷ In fact, saltationist views sometimes flirt with the idea that not just syntax, but language in its entirety, arose as one single event. While most claims are vague in this respect, Piattelli-Palmarini (2010: 160) states that it is “illusory” to think that words can exist outside of full-blown syntax, or that any protolanguage can be reconstructed in which words are used, but not full-blown syntax.

⁸ Linguistic fossils are also discussed in Bickerton (1990, 1998), although Bickerton claims that there is no continuity between such fossils, found e.g. in pidgin languages and early children’s speech, and modern grammars. In addition, Givón (e.g. 1979) also refers to vestiges of previous stages of language in present-day languages, in a very similar sense.

or phrase, as will be seen below. Consider also that Jackendoff's (and Bickerton's 1990) concatenation protolanguage stage differs from mine in another important respect: while theirs allows more than one argument per verb from the very start, I argue that the initial stage of proto-syntax was necessarily intransitive, as well as absolutive-like (Section 1.2).⁹

Bickerton (1990, and subsequent work) claims that what he terms "protolanguage" does not have syntax, and is in fact not real language for that reason (see also Section 1.6). My use of the term "proto-syntax" is meant to imply that this is a stage which shows syntax, although of a different, simpler kind.¹⁰ Postulating an absolutive-like two-word stage allows for a more fine-grained identification of stages, which in turn makes it easier to identify the pressures, as well as precursors, for evolving hierarchical grammars, including transitivity. The postulation of an intransitive absolutive-like stage also opens up the possibility of using crosslinguistic variation in the expression of transitivity to correlate these stages with the hominin timeline (Chapter 7).

This monograph thus challenges the view that syntax is an all-or-nothing package, and that it evolved suddenly in all its complexity. My position is instead that the capacity for syntax evolved gradually, in stages, subject to selection pressures.¹¹ It is based on very specific claims, whose feasibility can be evaluated and tested both in the theory of syntax and in neuroscience, as well as corroborated by the findings in other relevant fields or subfields, including language acquisition, grammaticalization theory, typology, aphasia, and genetics. There are several components of this proposal that set it apart from the other approaches to the evolution of language. First, this approach pursues an internal reconstruction of the stages of grammar based on the syntactic theory, to arrive at precise, specific, and tangible hypotheses. Second, it provides an abundance of theoretically analyzed "living fossils" for each postulated stage, drawn from a variety of languages. Third, the postulated stages, as well as fossils, are at the appropriate level of granularity to reveal the selection pressures that would have driven the progression through stages. Fourth, this approach offers a very

⁹ The meaning of the term "absolutive-like" will be made much clearer in Chapter 3. For now, it is to be understood as a construction with a verb and one single argument whose status as a subject vs. as an object of the verb is not syntactically specified. This characterization pertains most clearly to constructions which are ergative/absolutive both syntactically and morphologically, as will be explained in Chapter 3.

¹⁰ In this book, to avoid confusion, I will reserve the term "protolanguage" for presyntactic (non-combinatorial) stages of language, as is the one-word stage, even though, in principle, the term protolanguage could be taken to encompass proto-syntax as well.

¹¹ A reviewer has wondered if the term "gradual" can be interpreted to mean "continuous," as that would not be the correct characterization of what I mean here. The term has been associated with Darwinian adaptationism, and has been used in this context, with a clear sense of incremental processes, using small steps rather than leaps, as discussed at length in e.g. Dawkins (1996); see also Fitch (2010: 46). As Dawkins (1996) explains, by situating Darwin's writings within the context of the debates of his own time, one can clearly see that Darwin was not a constant-rate gradualist, as is sometimes suggested by punctuated equilibrium advocates.

specific experimental design for testing the proposed hypotheses. Last but not least, it arrives at a reconstruction which can be meaningfully correlated with the hominin timeline.

This monograph draws directly upon the field of theoretical syntax, and presents some of its key postulates in an accessible way so that cross-fertilization can be sought between this field and the fields of e.g. evolutionary biology, neuroscience, and genetics. An interdisciplinary endeavor of this scope will inevitably lead to some loss of depth and technical detail with each particular field, including when it comes to the theory of syntax, but my assessment is that any such loss is more than compensated for by the potential to cross-fertilize these fields, yielding insights that would never be possible by looking at each field separately. As much as this book is about reconstructing the evolutionary path for syntax, it is also deeply about what syntax actually is, as the two questions are inextricably linked. This particular evolutionary scenario offers a reconstruction of how communicative benefits may have been involved in the shaping of the formal design of language itself.

1.2 Proposal in a nutshell

1.2.1 *What did proto-syntax look like?*

Specifically, my proposal is that the first “sentences” were paratactic (not hierarchical, not headed) combinations of e.g. a “verb” and a “noun” (akin to present-day intransitive small clauses), in which the noun, the only argument of the verb, was absolutive-like, specified as neither subject nor object.¹² To put it in less technical terms, I propose that a proto-sentence was somewhat like a two-slot mold, which could fit just two words, for example one verb and one noun, and as such it could not be transitive, as a transitive structure requires three basic elements, a verb, a subject, and an object. While postulating two-slot proto-grammars may seem far-fetched at first sight, the (fossil) structures that clearly exhibit properties of such grammars are easily found across various constructions in all present-day languages, if not at the level of the sentence, then at the level of the noun phrase or at the level of the compound. My basic argument is that such fossil small clauses have been built into more complex hierarchical structures, rather than have been replaced by them.

¹² More accurately, instead of using the term “sentence” here, one can talk about combinations of nouns and verbs, as some of these combinations appear to be compounds used as names/nicknames. In addition, some of these combinations may involve predicates other than verbs, but the majority of the examples I consider in the monograph consists of a verb and a noun, which is also in line with Heine and Kuteva’s (2007) conclusion that nouns and verbs were the first (proto-)word categories to emerge in the evolution of human language. A reviewer points out that noun-noun compounds may also be of interest for this approach, as well as verb-verb combinations, as attested in serial verb constructions in some languages. I return to serial verb constructions in Sections 1.6 and 3.4.1, and to noun-noun compounding in Section 1.6.

There are additional reasons to believe that the first syntactic combinations were short (and binary), that is, that they consisted of only two (main) elements loosely/paratactically combined. First of all, binary branching in syntactic theory (including in Minimalism) is considered to be a syntactic universal, that is, it is considered that all syntactic operations can only join two elements at a time. The overwhelming majority of compounds across languages are binary, consisting of only two free morphemes. Child language acquisition is typically reported to proceed from a one-word stage to a two-word stage, before combining more words into single utterances becomes available (e.g. Bloom 1970).¹³ In addition, where (small) clauses themselves are combined paratactically with other such clauses (as in e.g. *Nothing ventured, nothing gained; Easy come, easy go; Come one, come all*), the number of clauses that combine is again overwhelmingly just two.¹⁴

There are some exceptions, such as *No shoes, no shirt, no service*; however, combining more than two expressions paratactically often becomes very difficult to process, as the following example helps illustrate:

- (1) Nothing ventured, nothing gained, nothing lost.

One is not sure what the above example means. Does it mean that if nothing is ventured, and nothing is gained, then nothing is lost either? Or does it mean that if nothing is ventured, then nothing is either gained or lost? Or something else? This is not grammatically specified in the example in (1), and our brains do not seem prepared to readily assign meanings to such ternary structures. The only way to unambiguously accommodate three or more clauses like that into a single utterance is by creating hierarchical syntax, using function words such as *if, then, and, etc.*

If our ancestors started with the capacity to use small (clause) paratactic grammars of the kind approximated above, they would have faced ample evolutionary pressures to develop a capacity for more elaborated grammars, that is, grammars that can accommodate a combination of more than just two clauses, as well as transitive grammars, which can accommodate more than two words/phrases. In other words, my claim is that the two-slot proto-syntax (an early stage in the evolution of syntax) characterized by paratactic union (#), operated both inside the sentence (to produce intransitive two-word proto-sentences, such as *Come # all*), and at the level of clause union (to produce binary combinations of the kind *Come one, # come all*).

¹³ In his Overview to the edited collection, Bloom (1994) specifies that the two-word stage is typically observed between the ages of eighteen months and two and a half years.

¹⁴ There is a wealth of data from a variety of languages which follow this AB-AC formula, and these are typically fossilized expressions, although in some languages, such as Hmong, they can be in productive use, exemplifying true *living* fossils (Chapters 2, 3, and 4).

It has been hypothesized by several researchers that there was a simpler stage of syntax in the evolution of human language, involving elements loosely concatenated into a single utterance (e.g. by Givón 1979, 2002a,b; Dwyer 1986; Bickerton 1990, 1998; Jackendoff 1999, 2002; Culicover and Jackendoff 2005; Deutscher 2005; Burling 2005; Gil 2005; Tallerman 2007, 2013a,b, 2014a,b; Hurford 2007, 2012; Progovac 2006, 2008a, b, 2009a,b; Jackendoff and Wittenberg 2014; and many others. My approach builds on these claims, and takes them significantly further, to hypothesize an intransitive, absolutive-like, two-word (small clause) stage (Progovac 2014a,b).

Using crosslinguistic data, Progovac (e.g. 2006, 2008a,b, 2009a,b) has extended the idea of paratactic proto-grammars (i.e. early evolutionary stages of grammar) to what is referred to in the literature as “small clauses” in embedded contexts, but which are also found in isolation as root small clauses (2, 4). According to this proposal, clauses in (2) and (4) are relevant fossils of the two-word stage, as they are not only intransitive, but also lack (at least) the TP (Tense Phrase) layer of structure, typically associated with modern finite sentences in Minimalism (3, 5). They can be reduced to a single layer of structure, the layer of the small clause.

- (2) Problem solved. Case closed. Me first! Him worry?!
- (3) The problem has been solved. The case has been closed.
I will be first! He worries?!
- (4) a. Pala vlada. (Serbian)¹⁵
 fall._{PART} government
 b. Pao sneg.
 fall._{PART} snow
 c. Stigla pošta.
 arrive._{PART} mail
- (5) a. Vlada je pala.
 AUX
 ‘The government has fallen.’
 b. Pao je sneg.
 ‘It has snowed.’
 c. Stigla je pošta.
 ‘The mail has arrived.’

My argument is that comparable small clauses served as precursors to more complex sentences (TPs) in the evolution of human language, given that they are syntactically

¹⁵ The form of the verb in the examples in (4) is a perfective participle form, indicating perfective/completed aspect. There is no past tense marking in these examples. In contrast, the past tense is marked in the examples in (5) by the auxiliary *je*.

measurably simpler, and given that, according to the theory, they provide a foundation for building TPs (Sections 1.2.2; 1.7).¹⁶

The argument for the proposed progression from a small clause to a TP stage has three prongs to it: (i) providing evidence of “tinkering” with the language design, in the sense that older structures (i.e. small clauses) get built into more complex structures (i.e. TPs); (ii) identifying “living fossils” of the small clause stage in modern languages; and (iii) identifying existing or potential corroborating evidence and testing grounds, from language acquisition, agrammatism, genetics, and neuroscience. In addition, the argument is that the progression from a small clause stage to a TP stage brings with it concrete communicative advantages, which could have been subject to natural/sexual selection (see Section 1.4).

It is important to keep in mind here that the fossils discussed in this monograph can only be seen as rough approximations of the structures once used in the deep evolutionary past. Depending on the language in question, such fossils in present-day languages may show morphological markings, e.g. case marking and aspect marking. It is in no way implied in this monograph that the proto-syntax in evolutionary times had any such morphology. The structures identified as fossils in this monograph count as fossils *in some relevant respect* under consideration, for example, in their lack of a TP, but not in all their properties. It also seems that some of the fossils discussed in the monograph (such as exocentric verb-noun (VN) compounds, e.g. *cry-baby*, *pick-pocket*, *hunch-back*, *rattle-snake*) are closer approximations of the proto-syntactic constructs than others, for the reasons given in e.g. Chapter 6, which discusses such compounds in great detail.

It is also of interest that different languages can use the foundational, fossil structures in different ways, and in different constructions. In some languages, the fossil constructions are still in productive use, as is the case with e.g. Serbian unaccusative small clauses in (4), to be covered in Chapter 2, and Hmong AB-AC formulae, as discussed in Chapters 2, 3, and 4. Looking at more languages in this light would uncover more types of fossil structures, and provide further insights into the evolution and nature of human language.

1.2.2 *A method of reconstruction based on Minimalism*

The method used in this monograph for hypothesizing the stages of proto-syntax can be characterized as internal reconstruction based on the theory of clause/sentence

¹⁶ In this respect, my analysis of small clauses being transformed into full sentences/TPs resembles, to some extent, the development of the heart (thanks to Garrett Mitchener, p.c. April 2013, for the analogy). The embryo initially has only a small precursor to the heart, consisting of two simple tubes which merge (“primitive heart”), and this precursor gradually bulges and expands to become the complex heart. A reviewer has pointed out that the analogy is not complete, as the complex human heart no longer has the two tubes discernible. Perhaps the analogy can at least be taken to show that the complex human heart does not come into existence in its full complexity, but that there is a simple precursor, however hard it may be to imagine one.

structure adopted in Minimalism (e.g. Chomsky 1995) and its predecessors. The simplified hierarchy of functional projections/layers characterizing modern clauses/sentences in Minimalism is given in (6).

(6) CP > TP > vP > VP/SC

Very roughly speaking, the inner VP (Verb Phrase)/SC (Small Clause) layer accommodates the verb/predicate and one argument, while vP (Light Verb Phrase) accommodates an additional argument, such as agent, in transitive structures. TP (Tense Phrase) accommodates the expression of tense and finiteness, while CP (Complementizer Phrase) accommodates subordination/embedding, among other processes (see Section 1.7 for more discussion).

This hierarchy is a theoretical construct which offers a natural and precise method of reconstructing previous syntactic stages in language evolution, as outlined in (7).

(7) Internal Reconstruction, based on syntactic theory
 Structure X is considered to be primary relative to Structure Y if
 X can be composed independently of Y, but Y can only be built
 upon the foundation of X.¹⁷

While SCs/VPs can be composed without the TP layer, TPs must be built on the foundation of a small clause/VP, as postulated in the theory of syntax.¹⁸ Likewise, while TPs can be composed without CPs, CPs require the foundation of a TP. One can thus reconstruct a stage of proto-syntax which had no TPs or CPs, but had SCs/VPs, and possibly also vPs. To put it differently, one can reconstruct a stage in the evolution of syntax in which it was possible to compose structures comparable to those in (2) and (4), but not structures comparable to those in (3) and (5).

Similarly, while SCs/VPs can be composed without a vP layer, the vP can only build its shell upon the foundation of a SC/VP. One can thus reconstruct a vP-less (intransitive) stage in the evolution of syntax, reduced to only SC/VP. By removing these three layers of hierarchical structure, one is essentially left with an intransitive flat small clause, which is arguably absolutive-like, and which approximates the small clause beginnings without functional projections, and without the possibility of distinguishing subjects from objects (see Section 1.2.1). I focus on reconstructing the properties of these TP-less and vP-less stages of proto-syntax in Chapters 2 and 3 respectively. The significance of the emergence of CP is discussed in Chapters 4, 5, and 6, but the focus of this book is on the earliest stages of proto-syntax, as they are

¹⁷ The term “primary” is used here in the sense that there was a stage in language evolution when the primary structure X was in use, but not the non-primary structure Y. This is also the sense in which the internal reconstruction method is used by Heine and Kuteva (2007), as elaborated below.

¹⁸ The idea that a sentence (TP) is built upon the foundation of a small clause is one of the most stable postulates in the theory (Section 1.7).

most relevant for the biological evolution of language, as well as most difficult to reconstruct.

The absence of each functional projection has concrete and observable consequences, as established based on the theory of syntax, as well as on the abundance of fossil data taken from across languages. A variety of these fossil constructions will be exemplified and discussed from this viewpoint throughout the monograph, including absolutes, unaccusatives, exocentrics, and middles. Consistent with the gradualist approach advocated here, it is significant that these fossils include constructions which straddle the boundary between transitivity and intransitivity: the so-called middles.

The recurring theme of this monograph is that each new stage preserves, and builds upon, the achievements of the previous stage(s). Thus, a TP is built upon the foundation of the small clause (which might or might not include a vP), and transitive structures (vP/VP shells), as well as “middles,” are built upon the foundation of intransitive (absolute-like) VPs/SCs. In brain stratification accounts (see e.g. Vygotsky 1979 and Jean Piaget’s work, as outlined in e.g. Gruber and Vonèche 1977), as well as in the triune brain proposals (e.g. MacLean 1949), the common theme is the inclusion of attainments of earlier stages in the structures of later stages (Section 2.5.5). This kind of scaffolding finds corroboration in the processes of language acquisition and language loss, as well as in language disorders.

A method of internal reconstruction is also used in Heine and Kuteva (2007), but based on a different linguistic theory: a theory of grammaticalization. Since grammaticalization typically works in the direction of developing a functional (grammatical) category out of a lexical category (or a more abstract category out of a more concrete category), but not the other way around, the authors reconstruct a stage in the evolution of human language which only had lexical (content) categories, but not functional categories. In that sense, lexical categories are primary with respect to corresponding functional categories (see Footnote 17). Importantly, the proposed syntactic reconstruction in (6–7) leads to a convergent result: stripping away functional layers (such as CP, TP, and vP) leaves one with a bare small clause, consisting typically only of a verb and a noun, with no functional projections on top. What these two methods share is that they use a *linguistic theory*, as well as a wealth of linguistic data behind these theories, to arrive at hypotheses about language evolution, and it is significant that these two approaches lead to a convergent result.

The sense in which the term “internal reconstruction” is used by Heine and Kuteva (2007: 24), as well as in this book, is based on the assumption that languages reveal evidence of past changes in their present structures, and that certain kinds of present alternation in a language can be reconstructed back to an earlier stage in which there was no alternation of that kind (see also e.g. Comrie 2002). The internal reconstruction

method contrasts with the comparative method, which necessarily looks at more than one language in order to reconstruct the language of the common ancestor.¹⁹

My approach does not lead to identical results to those reached by Heine and Kuteva (2007), but rather to results that complement each other, and reinforce each other. Heine and Kuteva's (2007) focus is on the lexicon, that is, word categories, while the focus here is on syntax/grammar, that is, on how the words in that lexicon were combined, and how these syntactic combinations got to be more complex over time.

It is worth pointing out, however, that the capacity for abstract vocabulary building is not unrelated to the emergence of functional categories and hierarchical syntax. Grammaticalization processes typically take more concrete words, such as *go*, *say*, etc., and metaphorically extend their meanings to the point when they become e.g. highly abstract functional categories (such as tense markers, or subordination markers; see e.g. Heine and Kuteva 2007 and references there). Thus, the capacity for hierarchical syntax probably presupposes the capacity for abstract vocabulary building based on metaphorical extension. According to e.g. Givón (2002a: 151–2), one reason to believe that some basic words used in isolation (one-word stage) preceded a syntactic stage is that grammatical categories are more abstract than lexical categories (see also Tallerman 2014a).

While my approach identifies specific syntactic stages of language evolution, as well as evolutionary pressures that would have driven the progression through stages, Heine and Kuteva do not explore the role of natural/sexual selection in the evolution of the lexicon or syntax. Even though the final evidence regarding the origins of human language may have to come from other disciplines, perhaps neuroscience and genetics, only linguistics can provide specific and linguistically sound hypotheses for these fields to engage.

This book thus contributes to the view that language, and in particular syntax, emerged gradually, through evolutionary tinkering. However, the gradualist view of the evolution of language is sometimes dismissed by pointing out that recently observed language changes are not always linear/directional, and that it is possible

¹⁹ It should be pointed out here that internal reconstruction (as opposed to the comparative method) has been used much less in phonological reconstruction, and that syntactic reconstruction in particular is much newer and less successful than phonological reconstruction. However, it is pointed out in e.g. Newman (2014: 13), as well as references cited there, that internal reconstruction has a lot to offer: "Although internal reconstruction (IR) is not as well understood nor commonly utilized as the comparative method, it has a long pedigree in historical linguistics (see Hoenigswald 1944; Kuryłowicz 1973). While recognizing the limitations of IR, most historical linguists appreciate its value in historical linguistics and would agree with Hock (1991: 550) when he concludes: 'internal reconstruction is an extremely useful and generally quite accurate tool for the reconstruction of linguistic prehistory.'" Newman also says in a footnote that Ringe (2003) is a "curious exception" in rejecting the IR method. This controversy aside, when it comes to the evolution of syntax, the internal reconstruction method is the only one available. It is also a method used for reconstructing language isolates, such as Basque.

both to develop certain (more complex) forms, and to revert back to the original (simpler) forms. So the question here is, once you evolve more complex structures, can you or can you not revert to a paratactic (small clause) grammar?

The basic claim of this monograph is that the foundational, paratactic structures remain built into the very foundation of the hierarchical grammars, and that they also continue to live in various marginal, and sometimes not so marginal, constructions, which can be characterized as “living fossils” of the paratactic stage. If so, then it should not be impossible to fall back onto these simpler, paratactic strategies, still alive in the brain, especially in the case of adversity, such as agrammatism, pidginization, and second language acquisition. Evolution should be able to revert back to more robust, foundational strategies. According to the so-called last in, first out principle, used in e.g. computer science and psychology (see e.g. Code 2005), what is acquired last is the most shallow/fragile layer that is the easiest to lose, and vice versa. When it comes to complex syntax, such loss can take place in pidginization and in agrammatic aphasia (see also Gil 2005 for the development of Riau Indonesian; also Heine and Kuteva 2007).

In fact, there are reversals elsewhere in the evolution of organisms. As observed e.g. in the work of Richard Dawkins, body hair is one of those traits that can recede and reappear a number of times in the history of a species (e.g. with mammoths, who rapidly became woolly in the most recent ice ages in Eurasia). In addition, some recent genetic studies reveal that reversals and losses are possible even in the evolution of multi-cellularity, a major transition in the history of life. For example, Schirrmester, Antonelli, and Bagheri (2011) report that the majority of extant cyanobacteria, one of the oldest phyla still alive, including many single-celled species, descend from multi-cellular ancestors, and that reversals to unicellularity occurred at least five times. In a sense, then, pidginization, and other similar losses of syntactic suprastructure, can be seen as comparable to the return to a simpler, unicellular mode of existence.

1.3 Three rough stages

As outlined in the previous sections, this monograph focuses on intransitive fossil clauses of various kinds, lacking the layers of functional structure characterizing modern clauses, including TP and vP layers. This monograph is further concerned with the nature of the bond between the merged elements in these proto-syntactic constructs, as well as with how that bond evolves over time to be able to support processes such as coordination and subordination. In this respect, I identify the following three *rough* stages in the evolution of syntactic bond (i–iii), following a hypothetical non-syntactic one-word stage (o). This progression is meant to shed light on the emergence of functional categories, as well as on the nature of modern language design, and the existence of various transitional, ambivalent structures (see Chapter 4 for details).

(o) One-word stage (no combinatorial power/no syntax)

This stage is characterized by single words intended as complete utterances (as in e.g. *Run! Snake! Out!*)

(i) Paratactic stage (proto-syntax)

In this paratactic stage, prosody/supra-segmentals provide the only glue for (proto-)Merge. In other words, in this stage there is prosodic evidence, but not any segmental evidence, that the words/constituents are Merged.²⁰ The proto-syntax of this stage can be characterized by an operation Conjoin (or proto-Merge), rather than Merge proper as conceived in Minimalism. As explained at length in Chapter 4, Conjoin, which is akin to Adjoin, does not create headedness or hierarchy, and the products of Conjoin are flat structures, which do not allow Move or recursion, as can be corroborated by looking at the present-day fossils which approximate this stage (Chapter 2). Adjunction itself is known to be rigid when it comes to Move, and adjuncts are well-known islands for movement, as discussed below (see also Chapter 5 on Subjacency).

(ii) Proto-coordination stage

This is a stage in which, in addition to prosody, a conjunction/linker provides all-purpose *segmental* glue to hold the utterance together. In this stage, the evidence for (proto-)Merge is more robust, as it retains the prosodic evidence (the only type of evidence available in the previous stage(s)), and adds to it segmental evidence (the linker), even though in this stage the segmental piece does not provide any more specific information regarding the nature of the categories and projections. In other words, in this stage the evidence for proto-Merge is dual: both prosodic (retained from the paratactic stage), and segmental (in the form of a linker), an innovation of this stage. This stage is arguably still syntactically flat/non-hierarchical, and still does not allow Move, which is consistent with the well-known fact that coordination structures even today constitute islands for Move (Chapter 5). The proposal is that the meaningless linkers/proto-conjunctions, best approximated by the conjunction of the type *and* in present-day languages, were among the first functional categories, whose initial purpose was only to consolidate the important achievement of Stage (i), the ability to (proto-)Merge, i.e. to Conjoin.

(iii) Specific functional category stage (hierarchical/subordination stage)

In this hierarchical stage, in addition to prosody and to segmental glue, specific functional categories become available, providing specialized syntactic glue for constituent cohesion, including tense particles and subordinators/complementizers. In

²⁰ Roughly speaking, prosody refers to the rhythm, stress, and intonation of speech, while segments refer to specific sounds.

other words, this stage includes all the attainments of the previous stages (prosody and linkers), and adds another, which is to use the segmental piece (linker) also to identify the type of the constituent created by Merge. I argue that it is only at this stage that hierarchical structure, Move, and recursion become available.²¹

These postulated stages mark a progression from least *syntactically* elaborated (parataxis), to more elaborated (coordination), to most elaborated (specialized functional categories/projections). My claim is that each of these grammars can operate both clause-internally, e.g. to combine a subject and a predicate into a small clause (e.g. *Come winter, . . .*), and clause-externally, to combine two such clauses into a single utterance (e.g. *Come one, come all*). As will be shown, all the hierarchical phenomena discussed in this book, including transitivity and CP subordination, seem to have alternative, paratactic routes.

This approach can explain why adjuncts and conjuncts are islands for Move, and more generally why languages exhibit Subjacency/islandhood effects in the first place (Chapter 5). It also sheds light on the vast overlap and indeterminacy between coordination structures and paratactic structures, at one end of the spectrum, as well as between coordination structures and subordination structures at the other end. The overlap is expected if each stage is taken to gradually integrate into the next (Chapter 4).

1.4 Can natural/sexual selection be relevant for syntax?

One encounters three main types of argument against subjecting syntax to a gradualist evolutionary approach. The first, as pointed out in Section 1, are the claims that syntax itself is an all-or-nothing package, and that syntax cannot be decomposed into evolutionary primitives or stages. Second, even if syntax can be decomposed in some fashion, the progression to a more complex syntax stage would involve the acquisition of principles such as Subjacency, which are just too abstract and arbitrary to be targeted by evolutionary forces. Third, it has been claimed that there was not enough evolutionary time to allow natural/sexual selection to operate on syntax or language in general (see e.g. Hornstein 2009).²² I briefly address each of these objections below,

²¹ What I mean by recursion in this monograph corresponds to what linguists typically mean by it: the embedding of a constituent of a certain syntactic category (e.g. a clause/CP) within another constituent of the same category (another clause/CP), as in (i) below (but see e.g. Tomalin 2011 for the confusion surrounding the term). Also typically associated with the use of the term recursion by linguists is the assumption that you can repeat the procedure in principle any number of times. This is essentially what Heine and Kuteva (2007: 68) call “productive recursion.” I return to recursion, and its different characterizations, in Chapter 4 (see also Section 1.7).

(i) I believe [_{CP} that Henry knows [_{CP} that Peter doubts [_{CP} that recursion is real.]]]

²² Another potential problem is raised by Christiansen and Chater (2008), which has to do with the constant and rapid language change. According to the authors, the linguistic environment over which

but in much more detail in Chapter 7. Chapter 7 also considers the basic timeline for the evolution of syntax, consistent with the postulated stages. Even in this broadest outline, this approach can help choose among some proposed hypotheses regarding the evolution of human species.

Regarding the first objection, this monograph not only shows that syntax can be decomposed into primitives, but also that the progression through these basic syntactic stages can be successfully reconstructed given syntactic theory, as discussed in the previous sections, and as will be elaborated in much more detail in subsequent chapters. As for the second objection, the intent of this monograph is also to show that the progression through the identified syntactic stages makes evolutionary sense, i.e. that each new stage brings some tangible advantage(s) over the previous stage(s), and that such advantage(s) were significant enough to have been subject to natural/sexual selection. These advantages are discussed throughout the monograph, but especially in Chapter 7.

For example, each step in the progression from one-word stage (no syntax), to small clause stage (paratactic two-slot syntax), to hierarchical TP stage accrues clear incremental communicative benefits. Small clauses (or half-clauses), with only one layer of structure, would have been immensely useful to our ancestors when they first started using syntax.²³ A half-clause is still useful, even in expressing propositional content—much more useful than having no syntax at all (one-word stage), and much less useful than having more articulated hierarchical syntax of the specific functional category stage. This is exactly the scenario upon which evolution/selection can operate.

According to Pinker and Bloom (1990), based on Darwin's work, the only way to evolve a truly complex design that serves a particular purpose is through a sequence of mutations/changes with small effects, and through intermediate stages, with each change/stage useful enough to trigger natural selection. This monograph explores exactly that kind of scenario for the evolution of syntax. As pointed out by Pinker and Bloom, it is impossible to make sense of the structure of the eye without acknowledging that it evolved for the purpose of seeing; evolution is the only physical process that can create an eye because it is the only physical process in which the criterion of being good at seeing can play a causal role. The same can be applied to language: evolution can create a system as complex as language because

selectional pressures operate thus presents a "moving target" for natural selection. However, in a commentary to this article, Fitch (2008) counters that the same issue of a rapidly changing environment also arises with uncontroversially adaptive biological processes, and calls for more sophisticated models of co-evolution between ontogeny, phylogeny, and language change in an attempt to understand the nature of language.

²³ The reference to half-clauses (in Progovac's 2008a paper titled "What use is half a clause?") is meant to mimic the typical objections to Darwin's adaptationist approach in general, in the form of "what use is half an eye?"

evolution is the physical process in which the criterion of being good at language/communication can play a causal role.

Moreover, not all linguistic innovations need have begun with a genetic change. The Baldwin Effect postulates that learning and culture can guide evolution, given that individuals using innovative features can set up a pressure for the evolution of neural mechanisms that would make decoding such innovative features of language automatic and undistracted by irrelevant factors, triggering conventional Darwinian evolution (Hinton and Nowlan 1987; Pinker and Bloom 1990; Deacon 2003), as discussed further in Chapter 7.

Chapter 7 summarizes the advantages that each postulated stage brings with it, and considers one concrete hypothetical scenario for progressing from one stage to the next, invoking sexual selection. For example, as shown in Chapter 6, exocentric VN compounds are fossil structures which specialize for derogatory reference (e.g. *turn-coat*, *kill-joy*, *cry-baby*, *hunch-back*), and which provide evidence not only of most rudimentary syntax, but also of ritual insult/sexual selection for such simple syntax (see Progovac and Locke 2009; Progovac 2012). Selecting for the ability to quickly produce (and interpret) such (often humorous and vivid) compounds on the spot would have gone a long way toward not only solidifying the capacity to use paratactic grammars, the foundation for more complex grammars, but also the capacity for building (abstract) vocabulary.

The abundance of examples from various languages offered in Chapter 6 makes it clear that these compounds combine basic, concrete words, often denoting body parts and functions, in order to create vivid and memorable abstract concepts. Thus, sexual selection for the capacity to produce and interpret such compounds could have been *one* of the factors facilitating the progression from the one-word stage to the two-word paratactic stage. There is no doubt that many other factors would have also contributed to solidifying this foundational syntactic strategy, given that having simple syntax, as opposed to having no syntax at all, accrues a host of communicative advantages.

As pointed out above, transitioning from the paratactic stage to the specific functional category stage may have proceeded through a linker/proto-conjunction stage in some cases, where the linker initially served only to solidify proto-Merge, as will be discussed in detail in Chapter 4. Perhaps the initial meaningless linker occurring between a subject and a predicate of a small clause gradually became a Tense particle which can now automatically express reference to past and future events, but also build a TP, and with it hierarchical structure. The grammaticalization of the functional projection such as TP renders automatic and undistracted the expression of the temporal and modal properties, allowing the speakers to break away from the here-and-now much more easily than is possible with paratactic small clause grammars (see Chapter 2 for the data showing that TP-less root small clauses are typically grounded in the here-and-now).

Breaking away from the here-and-now, and from the prison of pragmatics in general, may have been one dimension along which language evolved.²⁴ As will be discussed in Chapter 3, two-slot proto-grammars do not distinguish between subjects and objects, and it is typically pragmatics that determines the meaning of sentences created by such grammars. The same certainly holds of one-word utterances. So, imagine encountering the following one-word (8) and two-word (9) utterance sequences in a proto-syntax stage:

(8) Apple . . . Eat . . . John . . . Go . . .

(9) Apple eat. John go.

These kinds of utterances are much less precise (i.e. more vague) than a corresponding TP sentence such as (10) below, and can receive many interpretations in addition to the one in (10):

(10) John will (go and) eat the apple.

However, the meaning that does not readily come to mind with respect to (8) and (9) is the one expressed in (11), but that reading does not come to mind because of its pragmatic oddness, and not because there is anything in the structure of (8) or (9) that excludes it. In contrast, this reading is excluded by the structure of the sentence in (10), and it is the only reading that the structure in (11) allows.

(11) The apple will (go and) eat John.

This suggests that pragmatically odd (or impossible) propositions are harder to express without complex syntax, given that underspecified structures, resulting in vague interpretations, are in close alliance with the pragmatics of the situation; in this sense, such structures are prisoners of pragmatics. Adding the transitive vP and/or the TP layer to the small clause structure would have yielded more precise grammars, with subjects and objects more clearly differentiated, making it much easier to describe odd or pragmatically impossible events (11). This is so because with such grammars one can now unambiguously make “the apple” the subject of eating a human being. But one may wonder what good it does to be able to talk about apples eating humans.

First, it is important to keep in mind that language (and syntax) are not just used to express propositions and exchange information, but that they are also often used for playful purposes and in order to impress (see references in Progovac and Locke

²⁴ Displacement, roughly characterizable as the capability of language to communicate about things that are not present, is commonly thought to be one of the design features of human language, and moreover one of the features that arguably distinguishes human language from animal communication systems (see e.g. Hockett 1960; Hockett and Altmann 1968). This is the sense in which I am using the term “displacement” in this book. The reader should note that the same term is also used to refer to a completely different phenomenon, to the rearrangement of constituents within a sentence, as a result of the syntactic operation Move.

2009), something we formal linguists often forget.²⁵ Thus, if an ancient language user wanted to draw attention to himself by using language in a funny and surprising way, he would have had a much harder time doing so with structures such as (8) or (9), than with the structure such as (11), which relies on hierarchical syntax. This is just one way in which transitivity, and hierarchical structure more generally, would have been adaptive. Of course, the precision in expressing the argument structure (who did what to whom) would have been adaptive in so many other ways as well, including in gossip and story-telling, both of which rely on displacement.

In other words, the capacity for displacement, a key design feature of human language, is facilitated by hierarchical syntax. As will be discussed in Chapter 4, hierarchical syntax also enables Move and recursion, making it possible e.g. to embed one point of view within another. Therefore, once the innovation that was hierarchical syntax appeared on the evolutionary scene, there would have been multiple types of pressures to select for it.

This is not to claim that every single phenomenon of syntax, such as every single functional projection, or every single construction, has been selected; certain syntactic phenomena seem to be bundled together, and it may be enough for one of them to emerge to make the others possible. Likewise, just as is the case with the evolution of other aspects of living organisms, there will surely be phenomena in syntax that serve no particular purpose, and that can be seen as spandrels (i.e. by-products of some other adaptations), or which perhaps developed through drift (variation due to chance).²⁶ However, the existence of such phenomena should not distract one from identifying those aspects of language that responded to selection pressures, and from devising methods to test such hypotheses.

Finally, the third objection to the gradualist approach to language evolution is that there was not enough evolutionary time for the selection to take place. Pinker and Bloom (1990) propose that language evolved gradually, subject to the Baldwin Effect, the process whereby environmentally-induced responses set up selection pressures for such responses to become innate, triggering conventional Darwinian evolution (see also Deacon 1997; Hinton and Nowlan 1987). Deacon (2003) puts emphasis on learning, rather than innateness, in his adoption of the Baldwin Effect. He considers that masking and unmasking of “preadaptations” plays an important role in this process. As an innovative tool (e.g. language) became more and more essential to

²⁵ In this respect, Dunbar, Duncan, and Marriot (1997) report that only about 10–20% of conversation time is devoted to practical and technical topics, while the rest is devoted to social concerns (see also Tallerman 2013b).

²⁶ For example, the availability of Move may be inextricably linked to the availability of functional layers, such as TP and CP, which Move serves to connect (Section 4.4.5). Recursion itself may be a by-product of the emergence of specialized functional projections, such as CP for clausal subordination (Chapter 4). As argued at length in Chapter 5, Subadjacency should be seen as a by-product of other adaptations, and not a principle in its own right.

successful reproduction, “novel selection pressures unmasked selection on previously ‘neutral’ variants and created advantages for certain classes of mutations that might not otherwise have been favored” (93–4). At the same time, this innovative tool “masked selection on traits made less vital by being supplemented” by the innovative tool, such as perhaps the inventory and specificity of human calls (94). As clarified in Chapter 7, where I return to this topic, this approach ultimately reduces to Darwinian natural selection.

Tiny selective advantages are sufficient for evolutionary change; according to Haldane (1927), a variant that produces on average 1% more offspring than its alternative allele would increase in frequency from 0.1% to 99.9% of the population in just over 4,000 generations. This would still leave plenty of time for language to have evolved: 3.5 to 5 million years, if early Australopithecines were the first talkers, or, as an absolute minimum, several hundred thousand years (Stringer and Andrews 1988), in the event that early *H. sapiens* were the first.²⁷ Moreover, fixations of different genes can go in parallel, and sexual selection can significantly speed up any of these processes. The speed of the spread depends on how high the fitness of these individuals was relative to the competitors. According to e.g. Stone and Lurquin (2007), if relative fitness is high, it can take just a few dozen generations for the variant frequency to increase tenfold.²⁸

The initial arguments for the saltationist views, such as the postulation of the Middle to Upper Paleolithic revolution, as well as the dating of the FOXP2 gene, have now been mostly reconsidered (see Chapter 7 for more discussion on this). It was initially reported by Enard *et al.* (2002) that FOXP2 gene mutation in humans occurred at some point in the last 200,000 years, which could have then coincided with the emergence of syntax. However, it has since been found that the same mutation characterizes Neanderthals (Krause *et al.* 2007), which pushes the mutation back to at least the common ancestor, about half a million years ago (see e.g. Piattelli-Palmarini and Uriagereka 2011 for discussion).

Another type of evidence that has been invoked in favor of the saltationist view has to do with the postulation of the Middle to Upper Paleolithic transition/revolution. Based on archeological findings, Mellars (2002) and others have initially suggested that there was a major cultural and cognitive transition/revolution around 43–35,000 Before Present (BP). These archeological findings were often interpreted to mean that syntax (or language) in its entirety arose at this juncture, through one single event, such as a mutation (e.g. Bickerton 1995; Chomsky 2002, 2005). However, the more recent findings suggest that there was no human revolution, at least not at this

²⁷ Berwick *et al.* (2013) maintain that the capacity for language evolved about 100,000 years ago.

²⁸ As one example, the fitness of lactose tolerance is 2–3% higher in dairy areas. It took about 5,000–10,000 years to reach the current rates of lactose tolerance among northern Europeans, which is close to 100% with some populations.

particular juncture (see e.g. McBrearty and Brooks 2000; McBrearty 2007; and Mellars himself (2007: 3), as further discussed in Chapter 7).

In short, there is no real obstacle to studying syntax in a gradualist evolutionary framework. The recurring theme of this monograph is that there is evidence of evolutionary tinkering in the language design itself, consistent with the view that the complexity of syntax emerged gradually, through evolutionary tinkering. As a result, modern clauses are quirky and redundant (rather than optimal and perfect).²⁹ In this evolutionary perspective, rather than a system designed from scratch in an optimal way, syntax is seen as a patchwork of structures incorporating various stages of its evolution, and thus exhibiting a variety of quirky phenomena, many of which are discussed in this monograph.³⁰

1.5 Corroboration and testing

The gradualist evolutionary scenario for syntax, as outlined in this monograph, finds corroboration in practically every domain relevant for language, in addition to the fossil proto-structures found in modern languages. As discussed in various chapters in this monograph, in children, as well as in adults acquiring a second language, language clearly emerges gradually, through stages, arguably starting with the paratactic (small clause) stage, and it can also be partly lost in e.g. agrammatic aphasia and speech language disorders.

When it comes to neuroscience, there is converging evidence in the literature showing that increased syntactic complexity corresponds to increased neural activation in certain specific areas of the brain (see e.g. Caplan 2001; Indefrey, Hagoort *et al.* 2001; Just *et al.* 1996; Pallier, Devauchelle, and Dehaene 2011; Brennan *et al.* 2012). The experiments performed by Pallier, Devauchelle, and Dehaene (2011) and Brennan *et al.* (2012) have found a positive correlation between the levels of hierarchical embedding and the degree of activation in the brain, even when keeping the number of words constant. This is consistent with the proposal in this monograph that the complexity of syntax is graded, and that it evolved gradually. The proposals in this monograph are also specific and concrete enough that they themselves can be subjected to neuroscientific testing, as summarized in the Appendix to this book, which proposes specific experimental design.

²⁹ A reviewer suggests that while syntactic representations may be quirky and redundant, the syntactic operations, such as Merge, may be optimal and perfect. Again, in order for these claims to be falsifiable, one will need to define what “optimal” and “perfect” should mean in this respect (see Footnote 6). Besides, my argument in this monograph is that the crucial properties of syntax, including the operations such as Merge, have precursors (e.g. Conjoin), and that they, too, arose through evolutionary tinkering. In this view, the reason why syntactic representations show quirkiness today is because they often incorporate structures created by different types of operations, including by the precursors to Merge.

³⁰ The quirkiness of a variety of syntactic constructions is recognized in e.g. Culicover (1999) and Culicover and Jackendoff (2005), who refer to some such constructions as “syntactic nuts.”

It is also significant that the framework explored here can serve as a point of contact, an intermediary, between the fields of neuro-linguistics and genetics. To take one example, some recent experiments suggest that a specifically human FOXP2 mutation is responsible for increased synaptic plasticity, establishing better connectivity among the neurons in the brain (e.g. Vernes *et al.* 2007; Enard *et al.* 2009; see Section 2.5.4).³¹ If better synaptic plasticity is what facilitates the processing of more complex syntax, then one can hypothesize that the pressures to evolve the capacity for a more complex syntax could have contributed to the spread of the human mutation of e.g. the FOXP2 gene. Even at this preliminary level, one can appreciate the potential for synergy among the fields which can shed light on the evolution of human language: syntactic theory, neuroscience, and genetics. It is the evolutionary considerations like this that can provide the point of contact.³²

1.6 A brief comparison with Jackendoff's (and other) approaches

The work of Ray Jackendoff (e.g. 1999, 2002) on the evolution of syntax, in particular his characterization of syntactic “fossils,” provided an important component of the proposal that I am exploring in this book. This short section is in no way meant to be an overview of his approach, or to do justice to various aspects of his approach, but merely to indicate where my proposal converges with his, and where it diverges. Generally speaking, I would say that Jackendoff's approach is in broad strokes, with wider implications (including some discussion of phonology and morphology), while mine is narrowly focused only on the evolution of the layers of clausal structure, as postulated in the syntactic theory associated with Minimalism.

Also, as per the distinction drawn in Heine and Kuteva (2007), Jackendoff's approach is integrative, considering data from various domains, including language acquisition, pidgin languages, and aphasia, while mine is discipline-based, following, perhaps doggedly, a reconstruction method based on a syntactic theory, while the evidence from the other domains is only considered as secondary, corroborating evidence. Even though it seems plausible and insightful in many respects, Jackendoff's

³¹ FOXP2 is just one of several genes that are implicated in language and speech (disorders), and are thus of potential relevance for language evolution (see e.g. Vernes *et al.* 2007; Newbury and Monaco 2010, for FOXP1). Two other potentially relevant genes are CNTNAP2 and ASPM (see e.g. Dediu and Ladd 2007; Fitch 2010: 291; Diller and Cann 2012). The exact contribution of FOXP2 and the other genes remains to be determined, as rightly pointed out by a reviewer, but I do not think this can be determined without some concrete input by linguists, and without some specific, testable hypotheses about language evolution. If these genes were even partly selected for some specific language abilities then, without hypothesizing what these specific abilities might have been, we will not be able to find out.

³² There is no doubt that the researchers in each of these fields will notice that there are other possible takes and interpretations of the analyses and data presented here, and that there are many more complexities involved with each field than this approach can do justice to. Still, if this is one of the ways that all these fields can be brought together, then it is at least worth exploring.

(1999, 2002) approach does not easily lend itself to specific hypotheses that can be tested. Botha (2006: 135), among others, has pointed out that such windows into the evolution of language need to be accompanied by insightful theories.

My intent in this book is to show that following a narrowly focused and discipline-based approach leads to greater depth, and to some surprising novel insights, which in turn make it possible to formulate specific hypotheses and predictions, as well as to reveal clear communicative advantages that come with each stage. There is both a virtue and a curse in following this kind of simple and precise reconstruction method. The virtue is that you can be fairly confident in your reconstruction. The curse is that it does not tell you about other things.

The idea of syntactic fossils advocated by Jackendoff is very powerful, as is the idea that one can reconstruct the stages of language evolution by looking at the nature of language itself. I believe that my approach strengthens these ideas further by proposing that each new stage literally leans upon the structure of the previous one, and cannot exist without it.³³ On my approach, not only are the fossil structures used side by side with more complex structures (e.g. paratactic (adjunct) structures alongside hierarchical structures), but these foundational paratactic structures are literally built into the foundation of hierarchical structures. As will be shown, intransitive small clauses are built into vPs and TPs, and exocentric compounds are built into hierarchical compounds. Thus, on my approach, the fossil structures do not just provide cognitive scaffolding (i.e. increased cognitive abilities) for advancing to hierarchical language (e.g. Jackendoff 2009); the fossil structures also provide concrete *syntactic* scaffolding for hierarchical structures to be built upon.

Jackendoff (2002) identifies certain fossil principles of language, such as Agent First (where the agent precedes the patient/theme: e.g. *Bear chase boy*); Grouping (where modifiers are grouped next to the words they modify: e.g. *Brown bear chase boy*); Topic First (where the topic of the sentence appears before the comment); Focus Last; etc. These are still not syntactic principles, although they can be seen as precursors to such principles, especially the connection between the linear word order and the semantic/thematic role. These also relate to what Givón (1979) has called the pragmatic mode of language, which preceded the syntactic mode. In this respect, Hurford (2012) suggests that the first proto-sentences involved a topic-comment dichotomy, from which even the categories of nouns and verbs emerged. According to Hurford, the first proto-sentences consisted of two words juxtaposed, always in the topic-comment word order (653). It would be only at a later

³³ While Jackendoff (1999, 2002) has identified some fossils of the postulated one-word stage—proto-words which are not combinable with other words, such as *ouch*, *wow*, *shhh*, etc.—I have identified some rigid small clause structures in English (e.g. *Case closed*) and Serbian (*Pala karta* ‘Card played’), which also seem to be syntactic isolates in the sense that they cannot combine further (Chapters 2–4).

stage that topics would give rise to subjects, and comments would give rise to predicates.³⁴

While all these ideas can in principle be plausible, without having a theory that organizes these proposed principles, as well as illuminating the transition from one stage to the next, it is hard to know what kind of evidence bears on these hypotheses. It is also not clear from such a characterization what selection pressures, and what communicative advantages, led to the transition from the topic-comment based, or Agent-First based, language to the subject-predicate based language. For example, as Jackendoff's Agent-First protolanguage is already capable of communicating who does what to whom, and it already allows more than one argument per verb, it is not clear why there would have existed selection pressures to transition to the (transitive) subject-predicate grammars. In contrast, on my approach, which starts from an intransitive absolutive-like foundation, the communicative advantages of developing transitivity can be characterized clearly and precisely. In addition, this reconstruction down to the intransitive absolutive-like layer allows me to connect this proposal meaningfully to the typological variation across languages, as well as to the hominin timeline (Chapter 7).

More generally, Jackendoff (2002: 238) considers that protolanguage consisted of the following separable components: use of symbols; concatenation of symbols; use of open-class symbols; and use of word order to convey semantic relations. The hierarchical stage then adds to the protolanguage the following: symbols encoding abstract semantic relations, as well as grammatical categories and grammatical functions, including subject vs. object. This is the sense in which, for Jackendoff, the hierarchical stage subsumes protolanguage. However, as pointed out above, it is not clear how and why, and in what manageable, incremental steps, one proceeds from the concatenation of symbols with Agent First to a hierarchical transitive sentence with a subject and object. My approach puts emphasis on this incremental progression through stages, as well as on the specific communicative advantages gained with each incremental step.

Bickerton's (1990, 1998) influential work is also relevant here, as he has proposed that pidgin languages are indicative of our ability to tap into the proto-linguistic mode. However, in his view, pidgin languages (or child language) have no syntax, which leads him to a saltationist view of the emergence of syntax, from no syntax at all, to full-blown hierarchical syntax. Bickerton's main reason for considering proto-language to be without any syntax is his observation that the arguments routinely go

³⁴ However, see Casielles and Progovac (2010, 2012) for the idea that the so-called thetic statements are evolutionarily primary, and that they preceded categorical statements, those which feature such topic-comment diachotomies. Some examples of thetic statements include e.g. English *It rained*, and Serbian *Pao sneg* ('Fell snow'), which do not involve a clear diachotomy between a topic and a comment, or between a subject and a predicate, but rather describe an event as a whole. Such thetic statements also typically do not have agents, and often overlap with unaccusative constructions (see Section 3.3).

missing in these systems, and that syntactic language must obligatorily realize all the arguments of the verb. For Bickerton, these asyntactic systems do not even involve true language. Notice that Givón (1979: 296) has also proposed that there was a pre-syntactic, pragmatic mode of discourse, which had a “low noun to verb ratio.”

My approach has elevated the stage characterized by intransitivity (one argument per verb) not only to the level of language, but also to the level of (simpler) syntax. Given the logic behind the two-slot syntax, one is not dealing with missing arguments here, but rather with a coherent syntax which can accommodate only one argument per verb. Not only is this kind of proto-syntax syntactic and language-like, but such fossil structures are still available across various constructions and languages, including in English. In my analysis, the proto-syntactic stages clearly show continuity with the more innovative stages of syntax.

As pointed out above, Jackendoff (2002) advocates that word order in the proto-language stage followed the semantic ordering of Agent First. In contrast, my argument is that the initial stages were absolute-like, with agent and patient not being structurally differentiated at all. However, notice that Agent First may be relevant after all, even in my approach, although in a somewhat roundabout way. As discussed throughout the book (e.g. Section 3.4; Chapter 4), the paratactic small clause combinations of the kind attested in Nicaraguan Sign Language (e.g. WOMAN PUSH – MAN FALL) may have provided precursors to accusative-type transitivity (e.g. Senghas *et al.* 1997). We notice here that WOMAN is interpreted as an agent, and MAN as a patient, but this is not directly related to the Agent-First principle, given that one is dealing with two clauses here. Instead, this may ultimately reduce to Cause First principle, which is operative in a much wider array of paratactic combinations, including e.g. *Easy come, easy go; Nothing ventured, nothing gained*. In other words, given that the first clause (e.g. WOMAN PUSH; *Easy come*) is interpreted, roughly speaking, as Cause of the second clause (MAN FALL; *Easy go*), then WOMAN will be seen as the agent/causer. This will be discussed further, especially in Chapters 3 and 4.

While Jackendoff’s work, as well as Bickerton’s, is more about characterizing the fancy properties of modern syntax, which they list and illustrate, my approach is more about envisioning and illustrating what the initial, early syntax was like, in its own right, and its own logic. I offer a lot of data from present-day languages which arguably approximate these early stages, emphasizing the symmetry and flatness of proto-syntax, as opposed to asymmetry and hierarchy of modern syntax. Interestingly, if my approach is correct, it suggests that syntax was autonomous in this very early stage: while thoughts can be fluid, with many participants associated with one verb or event, the proto-syntactic mold only allowed one such participant to occur with the verb. In other words, the syntactic form did not just follow from the semantic principles, or from the properties of events, but it imposed its own logic and constraints.

The fossil structures discussed in Jackendoff (1999, 2002) also include English noun-noun (NN) compounds, such as *snowman*, *doghouse*, *housedog*. However, even though seemingly simple, these compounds, at least in present-day English, are headed and recursive, which may suggest more complex structure. Interestingly, this kind of NN compounding process is not productive, and certainly not recursive, in e.g. Serbian (see Snyder 2014 for other languages in this respect). Still, if there was a proto-syntax stage with verb-like and noun-like proto-words (as per Heine and Kuteva's 2007 reconstruction), then it would stand to reason that one should have been able to combine not just verbs with nouns, but also nouns with nouns, and verbs with verbs, as pointed out by a reviewer. However, the method of reconstruction that I follow, and the fossil evidence that I have gathered, do not lead to a clear conclusion in this respect, and I thus leave NN compounds for future research.

As for the verb-verb (VV) combinations, the discussion above suggests that at least some serial verb constructions across languages probably have a complex clausal origin, rather than just being plain VV compounds or concatenations (see Section 3.4.1 for more discussion on this). However, one does find an occasional VV compound which can be of evolutionary significance, such as Macedonian *veži-dreši* (tie-untie 'an ignorant person'), consisting of two imperative forms strung together (Olga Tomić, p.c., 2006); see especially Section 6.4 for the relevance of imperative morphology in compounds. Possibly of interest are also English *tie-dye* and French *passe-passe* ('sleight of hand').

Finally, a reviewer wonders if my approach cannot be somehow reconciled with the saltationist views (e.g. Chomsky 2005; Berwick and Chomsky 2011), if one can interpret their position to be that one single mutation occurred at a point when protolanguage in Bickerton's sense was already in place, in which case this one single mutation would have brought about hierarchical syntax. First of all, there are clear claims in Berwick and Chomsky (2011: 29–31) and elsewhere in this line of work to the effect that "there is no room in this picture for any precursors to language—say a language-like system with only short sentences," as quoted in full in Section 1.1. Bickerton (1990, 1998) shares this view. Some saltationists (e.g. Piattelli-Palmarini 2010: 160) go even further to propose that even unstructured protolanguage in Bickerton's sense could not have existed (see also Section 4.2.2).

Crucially, my approach has isolated a coherent two-slot, flat stage in the evolution of syntax, which provides a clear transition/intermediate stage between one-word protolanguage and hierarchical syntax. Not only that, but my approach identifies specific kinds of (paratactic) precursors to all the hierarchical phenomena discussed in the book, showing that the incremental, scaffolding approach is on the right track. In this respect, my approach differs sharply not only from Berwick and Chomsky's approach, but also from Jackendoff's and all the other approaches to language evolution (see Chapter 7 for more discussion on this). Importantly, one cannot object here that what I have reconstructed is not real language or real syntax.

As will be shown, such structures are found, in some form or another, all over present-day languages.

1.7 Syntactic theory

As an influential approach to syntax for an extended period of time, Minimalism (e.g. Chomsky 1995) and its predecessors (the frameworks leading to it, such as Government and Binding and Principles and Parameters), have accrued many insightful generalizations and analyses which provide important tools for analyzing structure. However, Minimalism has been in flux, and it would be unwise to base a whole evolutionary framework on one particular version of Minimalism. My solution to that is to rely only on well-established theoretical postulates: those which have withstood the test of time and empirical scrutiny within this framework, and which date back to the predecessors of Minimalism, as well as surviving into various later versions. In this section, I will thus present only some of those stable postulates, in particular those that will be useful for further discussion. For a fuller picture of the framework that I am adopting here, the reader is referred to e.g. Adger (2003) and Chomsky (1995). The discussion of Minimalist (and other theoretical) notions in this monograph will be made accessible to a non-expert, and only those postulates will be discussed that are relevant for further discussion.

As pointed out in Section 1.2.2, the theory of clause/sentence structure adopted in Minimalism (e.g. Chomsky 1995) and its predecessors involves a hierarchy of functional projections, which includes at least the following projections (several more projections have been postulated, but these are the ones that are largely agreed upon):

(12) CP > TP > vP > VP/SC

The structure is built bottom up, so that the inner VP/SC layer is formed first, to accommodate the verb/predicate and one argument.³⁵ The next layer, vP, accommodates an additional argument, such as agent in transitive structures. TP (Tense Phrase) accommodates the expression of tense and finiteness, while CP (Complementizer Phrase) accommodates e.g. subordination/embedding, and *wh*-movement, as discussed below.

The following derivation illustrates how one constructs a transitive sentence (TP) in this manner, starting from a small clause.

(13) Maria will roll the ball.

³⁵ Sometimes the initial combination of a verb and a noun is referred to as a VP (Verb Phrase), and other times as a SC (Small Clause). Even though it is a bit clumsy, I will use the label VP/SC here in order to reflect that reality, as well as because vP is a label for the light verb phrase, which is considered to be an additional layer of verb phrase. The layer of the vP structure on top of the VP is referred to as a vP/VP shell.

- (14) a. [_{SC/VP} roll the ball] →
 b. [_{vP} Maria [_{SC/VP} roll the ball]] →
 c. [_{TP} Maria will [_{vP} ~~Maria~~ [_{SC/VP} roll the ball]]]

[The strike-out notation is used to represent the original (pre-Move) copy of the moved constituent.]

In deriving the sentence in (13), one starts with the basic, small clause layer in (14a). At this point, one cannot know if *the ball* will be the subject or the object of the sentence (see 16 below). Then, the agent (Maria) is merged in the higher vP layer (14b), which is now responsible not only for accommodating this additional argument, but also for assigning (abstract) accusative case to the object (the ball). Finally, the TP layer is projected on top of the vP layer, and “Maria,” the highest argument, moves to become the subject of the TP (14c).³⁶

It is of note here that a corresponding intransitive sentence (15) can be derived without the vP layer, simply by moving the argument of the small clause to the TP layer (see e.g. Kratzer 1996, 2000; Chomsky 1995: 214 for unaccusatives):

- (15) The ball will roll.
 (16) a. [_{SC/VP} roll the ball] →
 b. [_{TP} The ball will [_{SC/VP} roll ~~the ball~~]]

It is of note here that the two derivations above illustrate the fluid, relative nature of subjecthood. While “the ball” in (13) is the object, in (15) it is the subject, even though its semantic role with respect to the event of rolling seems to be the same. This will be relevant for the later discussion of proto-syntactic structures, especially those involving absolutive-like roles in Chapter 3.

What is of relevance here is that the modern syntactic theory associated with the Minimalist Program (e.g. Chomsky 1995, 2001) analyzes every clause/sentence as initially a small clause (SC) which gets transformed into a full TP only upon subsequent Merge of tense, and subsequent Move of the subject to TP in English. This kind of analysis was originally proposed in Stowell (1981, 1983); Burzio (1981); Kitagawa (1985, 1986); and further solidified in the work of Koopman and Sportiche (1991); Chomsky (1995); and many others. This is thus one of those solid postulates in this framework that has withstood the test of time and empirical scrutiny.

The import of this incremental structure building for the evolutionary proposal in this book will become clearer in Chapters 2 and 3. The significance of the operation Move from the evolutionary standpoint will be discussed in Sections 2.2–2.4 and

³⁶ In fact, there is an additional Move operation postulated in this structure, that is, Move of the verb in V to the position of the light verb in v, but this operation is not directly relevant to the considerations in this book, except to characterize Move as a force whose more general purpose may be to connect the layers of structure, as per Section 4.4.5.

4.4.5. Further, Section 5.2 discusses *wh*-movement in the context of Subjacency, showing where *wh*-movement is possible, and where it is not.

Moving up the hierarchy in (12), *wh*-movement in e.g. English utilizes the CP layer of structure, which is constructed on top of a TP:

- (17) What will Maria roll?
- (18) a. [_{SC/VP} roll what] →
 b. [_{VP} Maria [_{SC/VP} roll what]] →
 c. [_{TP} Maria will [_{VP} ~~Maria~~ [_{SC/VP} roll what]]]
 d. [_{CP}What will [_{TP} Maria ~~will~~ [_{VP} ~~Maria~~ [_{SC/VP} roll ~~what~~]]]]

What happens in step (d) is that the *wh*-word *what* Moves to the CP layer, and so does the auxiliary verb *will*, as indicated by the strike-out notation. Many more instances of *wh*-movement are to be found in Section 5.2.

There are many complexities involved in characterizing Merge and Move, including the motivation for Move, the availability of landing sites for Move, and the restrictions on Move, including Subjacency, the latter discussed at length in Chapter 5. Minimalism typically relies on various grammatical features to implement Merge and Move, that is, to predict when these operations will take place and when they will not. The reader is referred to e.g. Adger (2003) for one detailed implementation of the feature checking theory.

Embedded sentences, introduced by the subordinator/complementizer such as *that* or *whether*, also rely on the CP layer, as illustrated below:

- (19) (I believe) that Maria will roll the ball.
- (20) a. [_{SC/VP} roll the ball] →
 b. [_{VP} Maria [_{SC/VP} roll the ball]] →
 c. [_{TP} Maria will [_{VP} ~~Maria~~ [_{SC/VP} roll the ball]]]
 d. [_{CP} that [_{TP} Maria will [_{VP} ~~Maria~~ [_{SC/VP} roll the ball]]]]

As discussed in Section 4.4, the CP layer may be instrumental in facilitating recursion when it comes to clausal embedding. The following example illustrates how CPs can be recursively embedded one within another:

- (21) I believe [_{CP} that John suspects [_{CP} that Sue will acknowledge
 [_{CP} that Maria will roll the ball.]]]

As pointed out in Footnote 21, recursion in linguistics is typically characterized as one type of category (in this case CP) embedding within another category of the same type (another CP), potentially ad infinitum (see Section 4.4 for much more discussion on recursion).

Just like functional projections are postulated on top of verb phrases, they are also postulated on top of noun phrases, although there is less agreement among syntacticians

regarding the nature and number of such projections when it comes to the noun phrase. One such functional projection postulated for English is a Determiner Phrase (DP) projection (e.g. Abney 1987), as in:

(22) [_{DP} the [_{NP} book on recursion]]

(23) [_{DP} Peter's [_{NP} book on recursion]]

In other words, a similar kind of hierarchical layering of structure seen with clauses also seems to characterize noun phrases. In this respect, it should be pointed out that nouns and verbs are considered to be lexical (content) categories, and NP and VP lexical projections of nouns and verbs, respectively. On the other hand, vP, TP, CP, and DP are all considered to be functional projections, as they are not direct projections of lexical categories.

Section 4.4.3 returns to DP structures in the context of the discussion of DP recursion in English and other languages. DP recursion is characterized in English by a repeated embedding of one possessive DP within another, as illustrated below:

(24) [_{DP} [_{DP} [_{DP} Peter's] friend's] book on recursion]

Section 4.4.3 discusses languages and constructions in which recursion is not possible, as well as the evolutionary significance of that.

What this section provides is a mere skeleton of the theory of structure building that is adopted in this book, to help the reader follow the discussion in the subsequent chapters better. Various other details of this theory will be discussed only when and if they become relevant.

1.8 Chapter-by-chapter overview

Chapter 2 focuses on TP-less (root) small clauses, mostly in English and Serbian, and shows that such clauses are measurably simpler than finite TP counterparts, and that they can be considered as (living) fossils of the small clause stage in the evolution of syntax. These clauses lack finite verbs, structural case, the ability to question or move constituents, and the ability to embed and show recursion.³⁷ These are exactly the characteristics postulated for the initial (paratactic) stage in the evolution of syntax. Many among the root small clauses in both Serbian and English are now marginal, formulaic expressions, although Serbian also has a type of small clause with a VN order, which is used productively in parallel with its TP counterparts, as a true *living* fossil. One finds corroborating evidence for the primacy of small clauses, and their

³⁷ It follows from the considerations in this monograph that (unbounded) recursion only becomes possible in the later stages of the evolution of language, more precisely when specialized functional categories emerge, as discussed at length in Chapter 4.

continuity with TP equivalents, in first language acquisition, second language acquisition, and agrammatism, and potential testing grounds in the fields of neuroscience and genetics.

Chapter 3 builds on the small clause analysis of *Chapter 2*, and takes it further to the conclusion that only *intransitive* small clauses, those that license only one argument, can be considered as true fossils of the initial stage of syntactic evolution. One arrives at the intransitive small clause stage via the method of internal reconstruction by removing the outer layers of functional structure, in this case the TP and the vP layers, the latter being responsible for transitivity and accusative case. The chapter goes even further to claim that this stage was characterized by an absolutive-like grammar, that is, an intransitive grammar in which the distinction between subjects and objects is not syntactically expressed.³⁸

Fossils of such an absolutive-like grammar are arguably found in all languages, and include absolutives, unaccusatives, certain nominals, and exocentrics (e.g. exocentric compounds).³⁹ Consistent with the gradualist evolutionary proposal for the expression of transitivity, one also finds various types of intermediate structures, including the so-called “middles,” which straddle the boundary between transitivity and intransitivity, and between subjecthood and objecthood. Corroborating evidence for an intransitive absolutive-like stage comes from child language acquisition, as well as from the initial stages of spontaneously emerging sign languages. Finally, neuroscience provides fertile testing grounds for this proposal.

Chapter 4 is concerned with the nature of the bond between the merged elements in these proto-syntactic constructs, as well as with how the syntactic bond evolved over time. In this respect, I identify three *rough* stages in the evolution of the syntactic bond: (i) the Paratactic Stage; (ii) the Proto-Coordination Stage; and (iii) the Specific Functional Category Stage (hierarchical stage), as outlined in Section 1.3. These syntactic stages follow a hypothesized one-word stage. This progression is meant to shed light on the gradual/incremental emergence of hierarchical syntax and recursion, as well as on the existence of various transitional, ambivalent structures that straddle the stage boundaries in modern languages.

In addition to a variety of living fossils of these stages found in modern languages, this progression of stages finds corroboration in the studies of language acquisition, agrammatism, grammaticalization, neuroscience, and animal communication. The corroborating evidence is more robust for the paratactic stage than it is for the proto-coordination stage, and this can be attributed to parataxis serving as the ultimate

³⁸ According to many authors, the notions of subjecthood and objecthood, which are descriptive terms particularly suited for nominative-accusative patterns, are not useful distinctions to make when it comes to ergative/absolutive patterns (e.g. Authier and Haude 2012; Blake 1976; Mithun 1994: 247; Shibatani 1998: 120; Tchekhoff 1973). This will be explained in detail in Chapter 3.

³⁹ These terms will be explained and illustrated in Chapter 3.

foundation for both coordination and subordination. The chapter identifies some concrete communicative advantages that each stage brings with it, making it possible to invoke natural/sexual selection in evolving hierarchical grammars (that yield recursion).

Chapter 5 on islandhood (Subjacency) is a good example of how evolutionary considerations of this kind can shed light on the very nature of language design, by explaining certain phenomena observed in modern syntax, which otherwise remain unaccounted for. Despite the sustained effort of syntactic theory for over forty years to account for the islandhood effects, that is, for the existence of constructions that prohibit Move, to date there has been no principled account. It is also significant that the postulated arbitrariness of Subjacency, the principle that is supposed to capture islandhood effects, has been used to argue that syntax could not have evolved gradually: one does not see why evolution would target a grammar with Subjacency, when its contribution to grammar is not clear, let alone its contribution to survival. As put in Lightfoot (1991), “Subjacency has many virtues, but . . . it could not have increased the chances of having fruitful sex.”

However, the approach explored here stands this argument on its head and shows that subjecting syntax to a gradualist evolutionary scenario can in fact explain the existence of islandhood effects. In this view, Subjacency is not a principle of syntax, or a principle of any kind, but rather just an epiphenomenon of evolutionary tinkering. Subjacency or islandhood can be seen as the default, primary state of language, due to the evolutionary beginnings of language which had no Move. This default state can be overridden in certain, evolutionarily novel, fancy constructions, such as hierarchical CPs. To put it differently, given that proto-syntactic (paratactic and proto-coordination stages) did not have Move (Chapter 4), the survivors of these stages, adjuncts and conjuncts, continue to show islandhood effects.

Chapter 6 considers in detail what may be the best fossils we can access today of the paratactic absolutive-like stage in the evolution of human grammar: the exocentric VN compounds (e.g. *turn-coat*, *cry-baby*, *hunch-back*, *pick-pocket*, *kill-joy*, *spoil-sport*). These fossils consist of just one verb and one noun, with the noun in the absolutive-like role. Structurally speaking, these compounds are exactly what the postulated paratactic stage would have looked like: a rigid combination of only two elements, a verb and a noun, with no subject/object distinction, and with no Move or recursion available. What is even more striking about these compounds is that they specialize for derogatory reference (insult) when they refer to humans, in language after language, which makes it plausible that comparable creations in the ancient past could have been used for ritual insult, and could have thus contributed to the sexual selection of this simplest type of syntax (Progovac and Locke 2009). Some corroboration for the primary nature of VN compounds comes from language acquisition and neuroscience, the latter in connection to the often obscene nature of these compounds.

Chapter 7 considers the communicative advantages gained by each new stage, and how the progression through each stage would have been guided by evolutionary pressures. This chapter looks in detail at one concrete evolutionary scenario that would have solidified the paratactic stage by way of sexual selection (see also Section 1.4). The approach explored in this chapter thus offers a reconstruction of how communicative benefits may have been involved in shaping the formal design of human language. Finally, given that the postulated stages of the evolution of human language are consistent only with certain hypotheses regarding human prehistory, this approach can also help choose among some competing hypotheses about the origins of the human species.

Chapter 8 summarizes and concludes, as well as considering future prospects and promises.

The Appendix, written jointly with neuroscientist Noa Ofen, considers how the main claims advanced in this monograph can be subjected to neuroimaging testing. There is already reasonable evidence from neuro-linguistics establishing that increased syntactic complexity correlates with the increased neuronal activation in the specific areas of the brain. The Appendix builds on that and proposes an experimental design for how specific hypotheses advanced in this monograph can be tested. To take one example, one can compare and contrast the processing of TP-less and vP-less small clauses/compounds with the processing of their hierarchical counterparts, which use the same vocabulary, and only differ with respect to tiny grammatical pieces, making hardly any difference in meaning in controlled contexts.

While the processing of full hierarchical structures is expected to show clear lateralization in the left hemisphere, with extensive activation of some specific Broca's areas, the proto-structures, including root small clauses and VN compounds, are expected to show less lateralization, and less involvement of Broca's area, but more reliance on both hemispheres, as well as, possibly, more reliance on the subcortical structures of the brain.

The small (clause) beginnings

2.1 Introduction

My proposal in this chapter is based on very specific claims, whose feasibility can be evaluated and tested both in the theory of syntax and in neuroimaging experiments, as well as corroborated by the findings in several other fields. Specifically, the proposal is that the first “sentences” were paratactic (not hierarchical, not headed) combinations of a verb and just one argument, akin to present-day intransitive small clauses (see e.g. Progovac 2006, 2008a,b, 2009a,b). The claim is that such structures are still found across various constructions in present-day languages, “living fossils” of this stage of grammar (see Jackendoff 1999, 2002 for the idea of living fossils in syntax). A living fossil in syntax can be characterized as a measurably simpler syntactic construct which nonetheless shows continuity with more complex counterparts, and which can be reconstructed back to a time when such complex counterparts were not available.¹ My take on small clauses as living fossils is that they have been preserved within modern sentences, rather than have been replaced by them.²

Many have proposed a simpler stage of syntax in the evolution of human language involving concatenation (e.g. Givón 1979; Dwyer 1986; Bickerton 1990; Jackendoff

¹ I believe that the term *living fossil* is appropriate to use in the context of my analysis, even though the rigor of proof may not be identical to what one finds in biology. As pointed out in Chapter 1, biologists consider lungfish to be a living fossil because it has changed little from its evolutionary past. In the case of lungfish, actual fossils, identical to modern Queensland lungfish, have been found and dated at over 100 million years, proving that lungfish is a living fossil (the term first used by Charles Darwin).

First of all, this suggests that living fossils in principle are possible, and that they can survive millions of years, living side-by-side more modern species. Second, even if biologists had not discovered the actual fossils, lungfish would still be a living fossil, and perhaps there would be some other, less direct way to prove this, or at least to hypothesize this. In other words, what I hypothesize to be living fossils of language evolution are not identical to, but are closely comparable to what is considered to be living fossils in biology. Clearly, the proposal that I am exploring here requires a different kind of proof.

² As pointed out in Chapter 1, the fossils as discussed in this monograph can only be seen as approximations of the structures once used in the deep evolutionary past. Such fossils in present-day languages may show morphological markings and other complexities which were not there in proto-syntax. These structures count as fossils in some relevant respect under consideration, for example, in their lack of a TP, but not in all their properties.

1999, 2002; Culicover and Jackendoff 2005; Deutscher 2005; Burling 2005; Hurford 2007, 2012; Tallerman 2007, 2013a, b, 2014a, b). Progovac (2006, 2008a,b, 2009a,b; 2013b, 2014a) has connected this idea to the well-known construct in syntax, “small clauses.” According to her proposal, small clauses used in isolation lack (at least) the TP (Tense Phrase) layer of structure, typically associated with modern sentences in Minimalism, and can be reduced to a single layer of structure. My argument is that comparable small clauses served as precursors to more complex sentences (TPs), given that they are syntactically measurably simpler (shorter by one or more layers of structure), and given that they provide a foundation for building TPs. Crosslinguistically, small clauses (SCs) are both pervasive and robust syntactic constructs, occurring in root contexts (as RootSCs), as embedded small clauses, as loosely attached adjuncts or conjuncts, and, most importantly, they also serve as foundation for building full sentences, according to Minimalism (e.g. Chomsky 1995, and subsequent work) and predecessors to Minimalism (see Section 1.7).

The argument for the proposed progression from a small clause to a TP stage has three prongs to it: (i) providing evidence of “tinkering” with the language design, in the sense that older structures (i.e. small clauses) get built into more complex structures (i.e. TPs); (ii) identifying “living fossils” of the small clause stage in modern languages; and (iii) identifying existing or potential corroborating evidence and testing grounds, from language acquisition, agrammatism, genetics, and neuroscience. Moreover, the goal is to show that each identified stage accrues concrete and tangible advantages over the previous stage(s), advantages that were significant enough to be targeted by natural/sexual selection.

The method for hypothesizing previous stages of syntax can be roughly characterized as internal reconstruction, based on the syntactic theory of structure building adopted in e.g. Minimalism (e.g. Chomsky 1995). My proposal is that a structure X is considered to be primary relative to a structure Y if X can be composed independently of Y, but Y can only be built upon the foundation of X. While small clauses can be composed without the TP layer, TPs must be built on the foundation of a small clause, providing syntactic proof that small clauses are more primary than TPs (see Section 1.2.2 for the definition of the term “primary” as used in the context of a reconstruction).

2.2 Root small clauses in English

Consider the following three types of (marginal) RootSCs (i.e. small clauses used in root/unembedded contexts): the so-called “Mad Magazine”/incredulity clauses in (1) (Akmajian 1984); imperative/optative clauses in (3); and RootSCs involving past participles in (5).³ While (2), (4), and (6) can be considered their respective full

³ The examples of small clauses offered in this chapter are all intransitive, consistent with my proposal that transitivity is a later evolutionary development in clause building, as well as with the syntactic analysis

sentential counterparts, no sentential paraphrase completely captures the expressive power of RootSCs, which seem to convey a sense of urgency and immediacy. This is just one indication that RootSCs are not simply elliptical versions of full sentences.

- (1) Him retire!? John a doctor?! Sheila happy?!
Me in Rome?!
- (2) Is he going to retire? Is John a doctor? Is Sheila happy?
Am I in Rome?
- (3) Me first! Family first! Everybody out!
- (4) I want to be first! Family should be first! Everybody must
go out!
- (5) Problem solved. Case closed. Point taken. Crisis averted.
Mission accomplished. Lesson learned.
- (6) The problem has been solved. The case is closed. The point is
taken. The crisis has been averted. The mission has been
accomplished. The lesson has been learned.

The clauses in (1, 3, 5) combine a noun/pronoun with a predicate (typically verb), resulting in a predication structure, arguably without functional projections, at the very least without a TP.⁴

While root small clauses are typically not discussed in syntactic literature, being delegated to the periphery (but see Progovac 2006), embedded small clauses, such as the bracketed clauses in (7) below, have received a lot of attention.

- (7) I wanted [the problem solved].
I imagined [Sheila happy].

There are competing analyses of embedded small clauses, including some that ascribe quite complex structure to them (see e.g. Cardinaletti and Guasti 1995; Dubinsky *et al.* 2000).⁵ However, the tendency is still, overwhelmingly, to label them as “SCs,”

according to which transitivity involves an extra syntactic layer, a vP shell, as discussed in Chapter 3. I assume here that passive-looking clauses in (5) do not involve a vP shell or Move(ment). Although I do not provide a specific analysis for these clauses, my approach allows for them to be treated as middle-like constructions, as discussed in Chapter 3.

⁴ The syntactic analysis of this kind of “nonsentential” speech is based on Barton (1990), Barton and Progovac (2005), and Progovac (2006, 2013a) (see also Tang 2005). Fortin (2007), who embeds her analysis in the phase framework of Minimalism (e.g. Chomsky 2001), also argues for the nonsentential analysis of certain syntactic phrases, such as adverbials, vocatives, and bare unergative verbs, but she specifically argues against such an analysis of any propositional constructs, as are small clauses in (1, 3, 5), which are the focus of this chapter.

⁵ One influential early analysis is Stowell (1981), which treats such clauses, at least in the embedded contexts, as headed structures, that is, as Adjective Phrases (APs) (*Me first!*), Verb Phrases (VPs) (*Him*

suggesting hesitance to commit to an analysis that renders them projections of their predicate, or of something else. In fact, the simplest among them may just be paratactic creations, in which the subject and the predicate combine by the operation Conjoin, which is akin to the operation Adjoin used in syntactic theory to account for the attachment of various adjuncts (e.g. adverbials) (for details, see Chapter 4). Conjoin here is to be understood in the simple sense “join together, unite, combine,” rather than in the sense of using a conjunction. Chapter 4 returns to the characterization of Conjoin, and paratactic attachment in general (Section 4.2). Suffice it to say here that Conjoin does not create headedness or hierarchy, but rather creates structures which can be characterized as flat, and not asymmetrical.

Uriagereka (2008) looks at the embedded SCs such as the ones in (7), and concludes that their structure is rather basic, and may involve the simplest type of syntax in Chomsky Hierarchy (Chomsky 1956; for characterization and detailed discussion of the Hierarchy, see e.g. Hurford 2012). One of the arguments Uriagereka invokes for the basic nature of (embedded) small clauses is the long-noted observation that these clauses do not have an internal source of abstract (structural) Case for their subjects, which are instead assigned Case by clause-external elements, such as the verbs *want* or *imagine* in (7).

According to Progovac (2006), RootSCs likewise do not have a structural mechanism for assigning case to their subjects, providing another argument that they are comparable to embedded SCs. Since with RootSCs there is no external source of case either (they are not embedded under a verb), their subjects surface with what can be characterized as default case (in the sense of e.g. Schütze 2001)—witness the accusative case on the pronominal subjects in (1,3).⁶ The evolutionary perspective sheds

worry?!), Prepositional Phrases (PPs) (*Everybody out!*), etc., based on the category of the predicate. Such clauses, however, have properties that suggest that they form a natural class, which would not be captured if they were labeled differently. For example, all of them can embed under a verb like *want* or *imagine* (i), even though these verbs cannot otherwise take APs or PPs as their complements (ii).

(i) He imagined [everybody out]/[the problem solved]/[me happy].

(ii) *He imagined [very happy]/[out of there].

[The “*” marks an ungrammatical structure.]

That is one reason why the label small clause (SC) still persists, tacitly acknowledging that we do not know what heads these structures, if anything at all.

⁶ As noted in Progovac (2006), small clauses found in isolation (e.g. *Problem solved. Case closed*) are even “smaller” than corresponding embedded small clauses, which require a determiner in the following examples:

(i) I consider the problem solved. / *I consider problem solved.

(ii) I consider the case closed. / *I consider case closed.

Essentially, some kind of grammatical relationship or functional projection is needed for syntactic embedding/subordination (see Section 4.4), and for that reason bare small clauses, such as the ones found in isolation, cannot embed (see also further discussion in the text).

The presence of the determiner *the* in embedded clauses instantiates the DP (Determiner Phrase) layer, which, according to e.g. Longobardi (1994), is necessary to establish a case-checking relationship between the higher verb and the subject of the small clause in English (Progovac 2006 has more discussion on this). This relationship seems to provide sufficient grammatical “glue” to allow embedding in this case (see also Section 4.4).

light on the existence of both embedded SCs and RootSCs—both can be seen as “living fossils” of a proto-syntactic stage in which, presumably, clauses were put together by an operation akin to adjunction (i.e. Conjoin), and in which there were no functional categories or projections to facilitate grammatical relationships.

In any event, small clauses do not have the functional power to assign their subjects a structural (nominative) case. In Minimalism, structural nominative case is associated with the projection of TP, providing another argument that root small clauses are not TPs. The next chapter will establish that absolutive-type fossils show a comparable property of not having the functional power to assign structural (accusative) case to their objects.

As established in Section 1.7, the modern syntactic theory associated with Minimalism analyzes every clause/sentence as initially a small clause (SC) (examples below in (a)), which gets transformed into a full TP only upon subsequent Merge of tense (examples in (b)), and subsequent Move of the subject to TP in English (examples in (c)). In other words, according to this influential analysis, the layer of TP is superimposed upon the layer of small clause:⁷

- (8) a. Small clause: [_{SC} Sheila happy]
 b. [_{TP} is [_{SC/AP} Sheila happy]] →
 c. Sentence: [_{TP} Sheila [_{T'} is [_{SC/AP} Sheila happy]]]
- (9) a. Small clause: [_{SC} Peter retire]
 b. [_{TP} will [_{SC/VP} Peter retire]] →
 c. Sentence: [_{TP} Peter [_{T'} will [_{SC/VP} Peter retire]]]
- (10) a. Small clause: [_{SC} (the) problem solved]
 b. [_{TP} is [_{SC/VP} (the) problem solved]] →
 c. Sentence:
 [_{TP} The problem [_{T'} is [_{SC/VP} ~~(the) problem~~ solved]]]

The (a) examples above involve only one clausal projection/layer, which can be uniformly characterized as a SC (small clause). The full finite clauses in (c) have at least two layers of clausal structure: the inner SC layer, and the outer TP layer, clearly creating hierarchical structure. In other words, small clauses morph/transform into TPs, as if the building of the modern sentence (TP) retraces its evolutionary steps.

The kind of derivation (from SC to TP) illustrated in (8-10) is the commonly accepted postulate in Minimalism and predecessors, dating back to the early 1980s. In

⁷ I do not use the vP shells of Minimalism here because I only discuss intransitive clauses, for which the vP shell is arguably not necessary. Chapter 3 discusses this issue in greater detail and actually proposes that the vP shell should be seen as a later evolutionary innovation, an additional layer of functional structure superimposed over the foundational VP layer, introducing agency and transitivity. In this view, original small clauses did not have vP shells.

fact, this is one of the most stable postulates in this approach, which has survived many changes of analysis and focus. In general, I base my proposal on the discoveries and claims which are reasonably uncontroversial within this approach, and which both predate Minimalism and survive into many later versions. Such stable postulates include not only the derivation of the sentence from the underlying small clause, but also the layering of sentential structure (e.g. CP>TP>vP>SC/VP), as established in Chapter 1.

Recall from Chapter 1 that my proposal relies on an internal syntactic reconstruction to arrive at the intransitive small clause proto-syntax:

Internal reconstruction of clause structure

A structure X is considered to be (evolutionarily) primary relative to a structure Y if X can be composed independently of Y, but Y can only be created upon the foundation of X.

This reconstruction claims that there was a point in time when only the primary structures X were available, but not the structures Y, as explained in Section 1.2.2. While small clauses (and VPs) can be composed without the vP or TP layers, vPs and TPs need to be built upon the foundation of a small clause/VP.

The ambivalence as to how to analyze small clause structures is the reason behind the persistence of the vague label “SC.” While the syntactic theory postulates that every category (head) projects a phrase (e.g. a noun projects a noun phrase; a verb projects a verb phrase; and a tense projects a tense phrase), and every phrase is a projection of a head, the label SC defies this very important postulate, as it is not clear at all what heads small clauses. One way to deal with this situation is to concede that small clauses are not modern hierarchical formations, but rather fossils of a paratactic proto-syntax stage, whose formations were neither headed nor hierarchical.

Kinsella (2009: 44) raises the question of why one should have Move in the syntactic theory, in addition to Merge, given that even in the Minimalist Program Move is sometimes considered to be “more costly” than Merge.⁸ This question is related to the question of why every sentence should begin as a small clause in the first place. But if the small clause core of the sentence can be seen as the first step in building sentential structure, as the paratactic scaffolding, then Move can be seen as a force which connects different layers of sentential derivation, created by evolutionary tinkering.⁹ In other words, the building of the sentence bottom up, from small clause to TP, may be seen, metaphorically, as retracing the steps of the evolutionary development of the sentence. Neither bottom-up sentence building, nor small clausal

⁸ Kinsella (2009) is a published version of Parker (2006).

⁹ But see e.g. McDaniel (2005) for a different view of Move, as discussed in Section 4.4.5. See also Hurford (2012) who considers that the initial impetus for Move may have been pragmatically driven, e.g. for focalizing or topicalizing purposes.

beginnings of the sentence, nor Move, would then need to be considered as conceptual necessities, but rather as just epiphenomena of evolutionary tinkering.¹⁰

In support of the claim that modern clauses have (at least) two layers of structure, notice that they can have two subject positions: one in which the subject is first Merged in the small clause, and the other in which the subject actually surfaces, after Move (8-10). In certain sentences, both subject positions can be overtly filled, as underlined below (see e.g. Koopman and Sportiche 1991):

(11) [_{TP} The jurors [_{TP} will [_{SC/VP} all rise]]].

The root counterpart of the small clause in (4) is also in use:

(12) All rise!

In this sense, then, a SC is indeed a half-clause in comparison to the corresponding TP, with a substantial overlap between the two layers, as will become even more obvious when we consider unaccusative small clauses in Serbian in the next section.

There is also some division of labor between root small clauses and their full sentential counterparts: while full TPs specialize for indicative mood and assertion, root small clauses tend to exhibit elsewhere, non-indicative, “irrealis” functions, ranging over expressions of incredulity, commands, wishes, etc. Root small clauses in general also specialize for the here-and-now, as further discussed in the following section. It is important to point out that overlap, and partial specialization, are hallmarks of evolutionary tinkering, but not of optimal design. According to e.g. Carroll (2005: 170–1), evolving multiple means to the same end creates the opportunity for the evolution of specialization through the division of labor.¹¹

In the evolutionary perspective, if there was a stage of proto-syntax characterized by root small clauses, then in that stage such clauses were probably able to express assertions as well, there not yet having arisen the opportunity for the division of labor.¹² The emergence of Tense/TP would have created such an opportunity for specialization between small clauses and full TPs.

A similar scenario, which can illustrate how the emergence of a more specialized category can lead to division of labor, has been reported for the grammaticalization of tense and indicative mood in more recent, historical times, in pre-Indo-European (pre-IE).¹³ Many Indo-Europeanists converge on the conclusion

¹⁰ At a more abstract level, the theoretical construct Move can be seen as a metaphor for interpreting one and the same constituent as somehow present/relevant in more than one position in a sentence. In fact, regardless of the metaphor used, having a gap in one place which needs to be linked to a constituent in another place in a sentence is a powerful mechanism of syntactic cohesion.

¹¹ Carroll (2005) shows that extra limbs/appendages of various kinds, with various species, demonstrate such specializations. In this respect, they also mention the specialization of human hands vs. legs.

¹² Serbian unaccusative RootSCs are still used to express assertions, as shown in the next section. They show specialization with respect to full TPs in other respects.

¹³ While Kiparsky (1968) estimates that Proto-Indo-European was spoken around 3,700 BC, Renfrew (1987) dates it back to 7,000 BC, and Gray and Atkinson (2003), using a computational model, to around

- b. Pala vlada. (cf. ??Vlada pala.)
fall.PART government
'The government has (just) collapsed.'
- c. Umro Petar. (cf. ??Petar umro.)
die.PART Peter
'Peter just died.'
- d. Pao sneg/mrak. (cf. ??Sneg/Mrak pao.)
fall.PART snow/darkness
'It has just snowed./It got dark.'

Among such SCs, many are formulaic/rigid/non-compositional in meaning, and with these the rigidity of VS word order is more obvious:

- e. Pala karta. (cf. ??*Karta pala.)
fall.PART card
'Card laid, card played.'
- f. Proš'o voz. (cf. ??Voz proš'o.)
gone train
'The opportunity has passed.'
- g. Pukla tikva. (cf. ??*Tikva pukla.)
burst.PART squash
'The friendship/alliance has ended.'

The full (TP) counterparts feature the finite (past tense) auxiliary *je*, as well as free(er) word order (14a-d). In addition, formulaic readings typically do not survive expansion into full clauses, as shown in (14e-g), which are interpreted literally.

- (14) a. Pošta je stigla. / Stigla je pošta.
mail is arrived arrived is mail
'The mail (has) arrived.'
- b. Vlada je pala. / Pala je vlada.
'The government (has) collapsed.'
- c. Petar je umro. / Umro je Petar.
'Peter died.'
- d. Sneg je pao. / Pao je sneg. Mrak je pao. / Pao je mrak.
'It snowed.' 'It got dark.'
- e. Karta je pala. / Pala je karta.
'The card fell.'
- f. Voz je prošao. / Prošao je voz.
'The train is gone.'

- g. Tikva je pukla. / Pukla je tikva.
‘The squash has burst.’

Unaccusatives can be roughly characterized as intransitive structures which blur the boundary between subjects and objects in the sense that their only argument is not an agent, but typically theme, showing some properties of objects. Consequently, unaccusative verbs (e.g. *arrive, fall, come, appear*) are analyzed crosslinguistically as Merging their sole arguments as objects, rather than as subjects (e.g. Perlmutter 1978; Burzio 1981, 1986). In Serbian, there is a preference even in the surface structure for unaccusative subjects to follow the verb, the position typically associated with objects. With unaccusative SCs in (13) this preference becomes more rigid, imposing the otherwise non-canonical VS order (see Progovac 2008a,b, 2013b, for details).¹⁷

Given this widely accepted analysis of unaccusatives, full/finite unaccusative clauses in Serbian and English are derived as follows:¹⁸

- (15) a. Small clause: [_{SC} pala vlada] →
 b. [_{TP} je [_{SC} pala vlada]] →
 c. TP Sentence: [_{TP} vlada [_{T'} je [_{SC} pala vlada]]]
- (16) a. [_{SC} spill the milk] →
 b. [_{TP} will [_{SC} spill the milk]] →
 c. [_{TP} the milk [_{T'} will [_{SC} spill ~~the milk~~]]]

Here, “the milk” can be considered object-like also in the sense that if there is an agent added, as in *John spilled the milk*, then “the milk” would clearly emerge as an object (for further discussion of this, see Chapter 3).

In the paper entitled “What use is half a clause?” Progovac (2008a) argues that root small clauses are “half-clauses” in comparison to the TP counterparts, which have an additional (TP) layer of structure. The clause in (15a) is a half-clause in comparison to the clause/sentence (15c), which has two layers of structure, SC and TP, and two subject positions, as also discussed below. Frequent arguments against Darwin’s theory of evolution have been of the kind: what use is half an eye? Since similar arguments have been raised against a gradualist approach to the evolution of syntax,

¹⁷ The closest English equivalents to rigid VS unaccusatives occur in fossilized expressions such as *Come winter, she will travel to Rome*; cf. **Winter come, she will travel to Rome*). Another example, *Come one, come all*, is found among the fossilized small clause combinations, as discussed in Section 2.4. Just as in Serbian, the word order in these expressions is VS, even though the word order in English is otherwise SVO, and Serbian typically shows a freedom of word order, with SVO being the default order.

¹⁸ As shown in the examples in the text, Serbian TPs can also retain the unaccusative VS order, in which case the tense particle *je* has to follow the verb (see example (14) in the text). Since *je* is a clitic, it has to observe the Clitic-Second requirement in Serbian, and that is why it cannot appear first in (14). There are many different approaches to the placement of clitics in Serbian, but for my purposes here I will assume that the SV examples in (14) are syntactically more complex than the VS counterparts, involving more movement operations, most notably subject raising to the specifier of TP.

it is instructive to wonder about whether such half-clauses would have been useful to our ancestors when they first stumbled upon syntax.¹⁹

As it turns out, such half-clauses are used productively in Serbian even today (13), alongside with the full TP counterparts illustrated in (14) (Section 2.4). As is the case with English root small clauses discussed in the previous section, Serbian unaccusative half-clauses also specialize for the here-and-now, reporting on an event that has just manifested itself. Consequently, these clauses cannot be modified by adverbs denoting remote past, such as “three years ago” (**Stigla pošta pre tri godine*, ‘arrived mail before three years’), leading again to a division of labor. Moreover, some formulaic unaccusative clauses (13e, repeated below) are only possible as half-clauses, and not as full clauses, when used to perform a speech-act in the context of a card game:

- (13e) Pala karta. (cf. [?]Karta pala. / [?]Karta je pala.)
 fall.PART card
 ‘Card laid, card played—you cannot take it back now.’

These clauses first of all provide a forceful argument that half-clause syntax is real: the VS word order in these clauses can only be explained if the widely-adopted unaccusative hypothesis is coupled with the small-clause analysis. The awkwardness of the (otherwise default) SV order (13) makes it clear that they are not just abbreviated/elliptical versions of some finite counterparts, such as those given in (14). Rather, these half-clauses, as well as the ones illustrated for English in the previous section, demonstrate consistent and systematic properties of a different, simpler clausal syntax, a syntax that involves one (less) layer of clausal structure, the basic (underived) word order (no Move), non-finite verb forms, and default case (for more details, see Progovac 2006, 2008b).

From the evolutionary standpoint, it is significant that half-clauses (13) to some extent overlap in function with their full equivalents (14), even though they show a degree of specialization as well, as elaborated in the repeated example below.

- (14’) a. Stigla je pošta.
 arrive.PERF.PART.F.SG is-3SG mail.F.SG
 ‘The mail has (just) arrived.’

¹⁹ As put in Carroll (2005: 170–1), “the erroneous notion . . . has been that the intermediate stages in the evolution of structures must be useless—the old saw of ‘What use is half a leg or half an eye?’” Such expressions of disbelief were partly due to the inability to imagine, based on the structure of the modern eye, how it could have been broken down into stages, and moreover stages that would have provided incremental advantages. The arguments against a gradualist approach to the evolution of syntax are of a comparable kind: given how we view/understand modern syntax today, we cannot imagine how it could have evolved through stages, and moreover how each new stage could have provided incremental advantages.

While the perfective participles in half-clauses contribute to the perfective aspect (but have no tense or TP), the full counterparts mark both perfective aspect (with the participle) and (past) tense (with the auxiliary *je*). This expression of tense/aspect must be redundant at least to some extent (especially for the here-and-now situations), given that only past tense auxiliaries in this case are compatible with these perfective participle forms.

Agreement properties of these clauses exhibit redundancy and overlap even more obviously. As indicated in the glosses in (14'), the participle form agrees with the subject in number and gender, but not in person, the type of agreement that also characterizes adjectives in Serbian. On the other hand, the auxiliary verb agrees with the subject in person and number (but not in gender). It is as though both layers of the clause have their own subject position (see previous section, examples 11–12), their own separate agreement properties, which partly overlap, and their own ways of encoding time/aspect, which again partly overlap. This provides evidence of tinkering with clausal structure, rather than evidence of optimal design.²⁰

My proposal in this respect is that a layer of TP (or a comparable functional projection) was at one point in evolution superimposed upon the layer of a small clause (half-clause), the proto-syntactic construct which already was able to express some basic clausal properties: predication and some temporal/aspectual properties.²¹ If so, then half-clauses would have been useful to our ancestors. A half-clause is still useful, even in expressing propositional content—much more useful than having no clausal syntax at all, and less useful than articulated finite syntax. This is exactly the scenario upon which evolution/selection can operate.

2.4 Small clause syntax is rigid (no Move, no recursion)

In addition to the obvious morpho-syntactic hallmarks of the discussed root small clauses in English and Serbian (absence of a finite verbal form, absence of nominative case checking in English, absence of subject raising with Serbian unaccusative SCs (resulting in strong preference for VS order), these clauses are also characterized by

²⁰ The argument here is that root small clauses both in English and in Serbian are approximations of a proto-syntax stage in the evolution of human language, and that the superimposition of a TP over the small clause layer works basically in the same way in both languages. A reviewer wonders if these data may not just be properties of particular languages, but not a design feature for the capacity for language. First of all, Minimalism and predecessors analyze every sentence/clause as starting as a small clause, and the intent for this analysis is to hold universally, in all languages. The English and Serbian data discussed here are thus just illustrations of this otherwise universal phenomenon. What I am claiming here is that this property of language, recognized in syntactic theory, reflects an imperfection, evidence of tinkering, rather than optimal design.

²¹ Finally, the reviewers wonder how one can distinguish between historical change and language evolution in this case. While historical language change is typically considered to be a change which does not have any genetic consequences, language evolution (and evolution in general) is typically associated with genetic changes. I address this issue in Section 7.3.5.

the following surprising properties: they do not tolerate movement of any kind (17–18); they cannot embed (one within another), and thus do not show recursion (19–20); their interpretation is typically confined to the here-and-now (21–23); and many among them are (semi-)formulaic. For all these reasons, these clauses cannot be analyzed as identical in structure or complexity to their full finite counterparts, nor can they be reduced to elliptical versions of the full counterparts.

The following (a) examples illustrate that small clause syntax does not exhibit (*wh*-) movement, in sharp contrast to the full sentences (b).²²

- (17) a. *Who(m) worry?!
 *Where everybody?!
 b. Who worries?
 Where is everybody?
- (18) a. *Kada stigla pošta?
 when arrived mail
 b. Kada je stigla pošta?

The examples below illustrate that a small clause of this type cannot embed into another clause, and thus does not show recursion. Recall from Chapter 1 that recursion is defined in this book, as per the traditional view, as a category of a certain type being embedded within another category of the same type. In this respect, what we see in (19) is a (failed) attempt to embed one SC within another SC.

- (19) a. *Him worry [me first]?
 b. *Him worry [problem solved]?
- (20) a. *Ja mislim [(da) stigla pošta].
 I think (that) arrived mail
 b. cf. Ja mislim [da je stigla pošta].

At first sight, it may seem that the clauses in (20) should be able to embed if the complementizer *da* is used, given that complementizers are supposed to provide the specific functional glue necessary for subordination, as per the discussion in Chapter 4. However, in syntactic theory it is considered that there is a hierarchy

²² Interestingly, as the reviewers of this manuscript have pointed out, some types of questions seem possible with substantival structures, and I have no good explanation for that. While (i) seems to be a fixed expression, an unanalyzed unit, (ii) illustrates that *why* can freely combine with various categories. Interestingly, however, neither of them can combine with a small clause (iv). The example in (iii) may be an echo question, that is, a question echoing what somebody else has said before.

- (i) How come?
 (ii) Why worry? Why now? Why Mary?
 (iii) Solve what?
 (iv) *Why Mary worry? *How come Mary worry?

of functional projections such that each functional category selects the next (e.g. Abney 1987; Adger 2003; but see e.g. Grimshaw 2000, who does not adopt this view of the hierarchy). Recall that this is the theoretical postulate on which my reconstruction method rests, making use of the hierarchy of functional projections: CP>TP>vP>SC/VP.

In this concrete case, a CP (Complementizer Phrase) needs to select a TP (Tense Phrase). This would mean that if a clause does not have a TP to begin with, it cannot build a CP or use a finite complementizer/subordinator. Serbian data illustrated in (20) conform to this pattern rather dramatically. The subordinate clauses with the tense auxiliary can be introduced by the complementizer, and are fully recursive (20b), while the clauses without the tense auxiliary cannot take a complementizer and cannot embed at all (20a).²³

Finally, the following data illustrate that small clauses are typically confined to the here-and-now, rejecting modification by adverbials denoting distant past.

- (21) a. *Stigla pošta pre tri godine.
 three years ago
 b. *Pala karta pre tri godine.
- (22) a. *Case closed three years ago.
 b. *Me first three years ago!

Clearly, we are dealing with two distinct types of grammar here: the simpler, rigid, TP-less small clause grammar, arguably approximating the ancient proto-syntax stage, and the more complex TP grammar, which subsumes the former in that a TP is projected upon the small clause foundation.²⁴ TPs have at least one more layer of structure than root small clauses (or “half-clauses”). Superimposing one layer (e.g. TP) over another (SC) creates hierarchy, as well as additional syntactic space for Move to target as it connects multiple layers of structure. Due to the wiring of the brain in this particular way throughout human evolution, it is entirely possible that the only way we humans can build sentences is by starting with the small clause, even if one can certainly envision more direct and more optimal derivations.

²³ A reviewer wonders about the English example in (i) in this respect:

(i) [_{CP} For [_{TP} John [_T to have left]]] would make sense.

The bracketed clause is still typically analyzed as having a C (*for*) which selects a TP headed by *to*. But the reviewer is correct to point out that sometimes the heads of TP or CP are allowed to be non-overt in this theory, which makes it harder to see how the hierarchy works.

²⁴ It is worth pointing out here that the rigid small clauses considered here seem to be syntactic isolates, in the sense that they cannot be easily embedded or modified, and in this sense they do not show recursion even in the Hauser, Chomsky, and Fitch’s (2002) weak sense of the term, which seems to reduce to the possibility to reapply Merge. Recursion is discussed in much more detail in Chapter 4.

Quite clearly, these data cannot be attributed to any cognitive restrictions: the ability to embed examples in (20b), but not those in (20a), depends solely on the structural properties of these two types of clauses. The significance of this for the evolutionary argument is that one may in principle be capable of recursive thought, but cannot express it through language via subordination if the structural properties of language are limited in this way.²⁵ Given these data and analyses, one can reconstruct a gradualist progression from proto-syntax to the development of recursion, as discussed in Chapter 4.

Notice that Move and recursion, reducible to Merge, are considered to be universal and defining properties of human language among most Minimalist researchers (see e.g. Hauser, Chomsky, and Fitch 2002; Chomsky 2005; Moro 2008). While Hauser, Chomsky, and Fitch (2002) do not define it, what seems to be meant by recursion by them is the ability to apply and then re-apply Merge, so perhaps this sense of recursion can be characterized as recombining (see e.g. Tomalin 2011 for some useful discussion). In other words, the operation Merge can apply repeatedly. The ability to recombine/re-Merge in this way yields hierarchy, but not necessarily what is typically considered to be recursion by linguists, that is, the ability to embed one category (e.g. CP) within another category of the same type, in an unlimited fashion (see Chapter 4 for more discussion on this).

If considerations in this book are on the right track, then Move and recursion cannot be the defining properties of human language, not even recursion in the weak sense of recombining. Nor can they be reduced to Merge. Rather, both Move and recursion should be seen as relatively recent, fragile innovations, which emerged with the hierarchical stage (as discussed at length in Chapter 4).

The TP/CP grammar allows for embedded recursion (23) and for the expression of a variety of nuanced meanings with respect to the temporal/aspectual/modal properties of the clause (24):

(23) He worries [that I think [that the problem has been solved]].

(24) The problem has been/may have been/will be solved.
I will be/should be/better be first.

The small clause grammar, on the other hand, allows for flat concatenation of two clauses, of the type illustrated in (25–34), once again often resulting in (semi-)formulaic expressions, not subject to questioning or recursion (see Progovac 2010a):²⁶

²⁵ A reviewer has wondered how recursive thought is related to recursive syntax. As my goal in this monograph is to confine my claims to what my reconstruction and my fossil data lead me to, this question falls outside the scope of this monograph. Still, for what it is worth, I believe that, as in art, the medium partly shapes not only what you can express, but also what occurs to you to express.

²⁶ The reader will notice that not all of these “clauses” involve a noun-verb combination, but that there are other possibilities as well. Most of them involve an interesting AB-AC pattern, although in the Serbian examples the As are not identical, only similar (correlated) in some sense. In spite of the differences among them, they all seem to exhibit a characteristic rhythm and symmetry.

- (25) Nothing ventured, nothing gained.
- (26) Easy come, easy go.
- (27) First come, first serve.
- (28) Monkey see, monkey do.
- (29) Come one, come all.
- (30) Like father, like son.
- (31) So far, so good.
- (32) Preko preče, naokolo bliže. (Serbian)
'Across shorter, around closer.'
- (33) Što na umu, to na drumu.
what on mind that on road
'What one thinks, one says.'
- (34) Duga kosa, kratka pamet.
long hair short intelligence
'Who wears long hair has little intelligence.'
- (35) Wo dua wo twa. (Twi)²⁷
you sow you reap
- (36) Wo hwehwea wo hu.
you seek you find

As discussed in Chapter 4, the glue that holds these small clause combinations together is paratactic, resulting in a non-hierarchical, symmetric bond, arguably created by the same operation Conjoin which joins the subject and the predicate in flat small clauses (Section 2.2). Let me represent the paratactic process Conjoin with the symbol #:

- (35) [sc Monkey # see] # [sc monkey # do]

In fact, if musical protolanguage was an episode in the evolution of human language (see e.g. Darwin 1874; Fitch 2010: 475), then it would have been most useful right here, in this paratactic stage, in which the rhythm and melody would have served to hold together not only two-word clauses, but also binary combinations of such clauses. However, unlike in Fitch's proposal in which a musical stage preceded words (criticized by Tallerman 2013a), the use of melody/prosody here would have been compositional, used to combine words into larger utterances (see also Section 4.2).

²⁷ Twi is spoken in Ghana. Thanks to Kingsley Okai (p.c. 2011) for supplying the data.

The best evidence of rigid syntax is typically found among intransitive constructions, specifically among unaccusative and absolutive-like constructions. This observation is taken up in the next chapter, which postulates an intransitive, absolutive-like stage in the evolution of syntax, and which discusses its many modern manifestations. The next section considers corroborating evidence and testing grounds for the small clause proposal explored in this chapter.

2.5 Corroborating evidence and testing grounds

There exists abundant corroborating evidence for the small clause beginnings of language, which comes from the gradual emergence of syntax in child language acquisition and second language acquisition (Section 2.5.1) and from agrammatism (2.5.2). In addition, neuroscience (2.5.3) and genetics (2.5.4) constitute possible testing grounds for this hypothesis. Section 2.5.5 considers various other stratification-based approaches to evolutionary progression, adding to the plausibility of the proposal explored in this monograph.

2.5.1 Language acquisition

When it comes to first language acquisition, it has been argued by many that children go through a root small clause/root infinitive stage (e.g. Radford 1988, 1990; Lebeaux 1989; Platzak 1990; Ouhalla 1991; Guilfoyle and Noonan 1992; Rizzi 1994; Jordens 2002; Potts and Roeper 2006; but see e.g. Guasti 2002; Pinker 1996, for opposing views). Of course, this stage follows the well-known one-word stage in which single words are used often to express full propositions (e.g. Bloom 1970). According to Radford (1990), children enter the one-word stage at about ten months of age, start sequencing single words at around fifteen months, and start using something comparable to small clauses around two years of age. This sequencing represents a plausible transition from one-word stage to a small clause stage in evolution as well (Chapter 4).

Below are some examples from child English, using root small clauses, based on Guasti (2002):

- (37) Marie go. Me go.
 Eve gone.
 Kitty hiding.
 You nice.

These data are obviously missing markers of finiteness, and can thus be analyzed as TP-less small clauses, as they are in e.g. Radford's work. It is also obvious that these data are directly comparable to the root small clauses in adult speech, as introduced in the previous sections, which also consist of a noun/pronoun and a predicate, either involving a non-finite verb (infinitive or participle), or some other predicate, such as

adjective. If these are essentially the same kinds of root small clauses, used by both adults and children, then it is not surprising that children's initial stages of language development do not show embedding/subordination or Move, both reported to be rather late developments in children (e.g. Radford 1990; Lebeaux 1989; Ouhalla 1991; Platzak 1990; Potts and Roeper 2006; Hollebrandse and Roeper 2007). The claim in this monograph is that Move and recursion are unavailable to paratactic (small clause) grammars. As shown in Section 2.4, adult root small clauses, taken to be fossils of the paratactic small clause stage in language evolution, also show no Move or recursion. Given the small clause data in adult speech and in language acquisition, one can conclude that a small clause stage in language evolution was not only possible, but highly probable.

Early stages of second language acquisition have been analyzed in a similar light. According to e.g. Klein and Purdue's (1997) influential work, second language acquisition can stabilize/fossilize at the stage of the so-called Basic Variety, which is, according to them, a well-structured, simple, and efficient form of language. The Basic Variety also does without most functional categories, complex hierarchical structure, Move, and subordination.

A reviewer has wondered why language acquisition would be relevant for the considerations of language evolution. First, I should remind the reader that my proposal is based on syntactic reconstruction, as well as on the availability of syntactic fossils, and I use language acquisition only as corroborating evidence for the proposal, and not as main evidence. Having said that, let me also point out that in my proposal language evolved through scaffolding/layering, in such a way that the lowest layers served as necessary foundation for the higher layers. The prediction of this proposal is that child language, to the extent that it emerges in stages, has to observe the same scaffolding. So, even without any ontogeny/phylogeny connections ever established in biology, child language acquisition would still be relevant for language evolution considerations, at least for the approach that I am pursuing in this monograph.

In biological texts (e.g. Ridley 1993: 551; also Strickberger 2000: 493–4), the relationship between ontogeny and phylogeny is considered to be a classic topic in evolutionary studies, despite much controversy surrounding it. In my work, I do not consider that ontogeny literally *recapitulates* phylogeny, but only that it can be used as secondary, corroborating support for a proposal that is independently established. This is in line with e.g. Studdert-Kennedy (1991); Rolfe (1996); Locke (2009); Locke and Bogin (2006), who suggest that present-day views warrant the use of ontogeny to *corroborate* hypotheses about phylogeny.

When it comes to the studies of the evolution of language, Burling (2005, 174) makes use of the phylogeny/ontogeny connection, and so does Lieberman (e.g. 2000) in his discussion of the descent of larynx. In his work on Riau Indonesian, Gil (2005) also invokes the phylogeny-ontogeny connection. In particular, he argues that Riau

comes close to being a perfect example of an IMA (Isolating–Monocategorical–Associational) language, a language whose syntax can be characterized as exhibiting a simple combinatorial operation (call it Conjoin), the semantic effect of which is a loose associational relationship. According to Gil, IMA language may constitute a stage both in language acquisition and language evolution.

On the other hand, as a reviewer points out, Yang (2013) argues that there is no connection between phylogeny and ontogeny when it comes to language, and concludes from there that gradualist approaches to language evolution are not feasible. However, in the final analysis, this article cannot reach both of these conclusions at the same time. That is, one cannot claim that the connection between ontogeny and phylogeny is irrelevant, and then use it (i.e. use the supposed lack of correspondence between the two) to make an argument that there was no gradual evolution of language. I thus interpret this article to be actually using the (lack of) ontogeny/phylogeny connection in a certain domain to make an argument against a gradualist approach to the evolution of syntax. This paper is discussed further in Section 4.5.1.3.

The reviewer also wonders if there is enough evidence for a two-word stage in first language acquisition. It has been reported by various researchers that there typically is such a stage, a stage where utterances of more than two words are very rare (e.g. Bloom 1970; Bloom 1994). Of course, a two-word stage does not eradicate the one-word stage, as I discuss in this monograph, and thus this stage would encompass both one-word and two-word utterances. It is worth mentioning in this respect that the level of language proficiency in children is typically measured by the mean length of their utterances (MLU), characterized as the number of words/morphemes per utterance. It is well-known that MLU increases gradually with age, and it is often used as an indicator of the acquisition stage. I return to this issue in Section 3.5, where I discuss the absolute-like nature of children's two-word utterances.

However, an influential theory of language acquisition, the Continuity Hypothesis, has proposed that in spite of appearances, children's grammars, from the very start, are full-blown adult grammars, where the functional categories are only superficially missing (see e.g. Guasti 2002 and references there; Pinker 1996; see also the quote from Berwick and Chomsky 2011 in Section 1.1). The rationale behind the Continuity Hypothesis is that without assuming it, there is a discontinuity between child grammars and adult grammars, and it would be a difficult task to explain how children then advance to adult grammars (see also Section 3.5 for more discussion on this). Interestingly, comparable arguments have been advanced against the gradualist approach to the evolution of syntax.

When it comes to the continuity of syntax, Progovac *et al.* (2006) have proposed in the Epilogue that continuity lies in small clause/paratactic grammars, rather than in full finite grammars. As pointed out above, both children and adults use small clause grammars, and, moreover, small clauses are built into the very foundation of finite sentences. For agrammatic patients (see following subsection), even when they lose

the ability to consistently produce full sentences, they are often capable of producing small clauses. According to Kolk's (e.g. 2006) study of Dutch and German, normal adults produced 10% non-finite root clauses, aphasics produced about 60%, and in children the overuse of non-finite root clauses decreases with age: from 83% in the two-year-olds, to 60% in the two-and-a-half-year-olds, to 40% in the three-year-olds. There is thus continuity and common ground in the use of small clause/non-finite grammars across all these groups.

Clearly, if small clause grammars are the foundational structures, upon which everything else rests, then they are expected to emerge first for that reason alone. Given that adults use small clause grammars as well, both in root and embedded contexts, children are exposed to simpler grammars, and the continuity of language is not disrupted.

2.5.2 *Agrammatism*

Agrammatism offers another source of corroborating evidence for the primacy of simpler, paratactic grammars. When it comes to aphasia, Kolk (2006; also Kolk 1995; Kolk, van Grunsven, and Keyser 1985) has argued that the preventive adaptation results in a bias to select simpler types of constructions, often sub-sentential, including root small clauses and root infinitives (see also Friedmann and Grodzinsky 1997). The argument is that the impaired system reorganizes to exploit alternative routes to the same goal.

- (38) Koffie drinken.
coffee drink-_{INF}
- (39) Portemonnaie verloren.
wallet lost-_{PAST.PART}
- (40) iedereen naar buiten
'Everybody out'

Just as with the English small clause data, the data above illustrate clauses with non-finite verb forms, in particular the infinitive (38) and the past participle (39), as well as clauses without a verb (40). The use of non-finite clauses in Dutch and German is significant not only because they occur so frequently in agrammatism, but also because they involve morphology and word order that are distinct from what is found in the corresponding finite clauses. Just as with the Serbian data discussed in sections 2.3 and 2.4, this again indicates that one is dealing with a distinct, simpler type of grammar, which cannot be reduced to elliptical versions of full finite sentences.

2.5.3 *Neuroimaging*

Neuroimaging can provide a fertile testing ground for various evolutionary claims, including the hypotheses explored in this chapter. My suggestion is that one can use

the subtraction and other neuro-linguistic methods to determine how paratactic small clause structures are processed in comparison to their more complex (TP) counterparts, in an attempt to identify neuro-biological correlates of TP layering and finiteness (see Progovac 2010b).

For the reasons given in the Appendix, while the processing of full TPs is expected to show clear lateralization in the left hemisphere, with extensive activation of specific Broca's areas, the proto-syntactic structures, including root small clauses, are expected to show less lateralization, and less involvement of Broca's areas, but more reliance on both hemispheres, as well as, possibly, more reliance on the subcortical structures of the brain. This can be tested given the availability of minimally contrasting pairs in English and Serbian discussed in this chapter, such as *Case closed* vs. *The case is closed*; *Pao sneg* vs. *Sneg je pao* (13–14). A detailed proposal to this effect can be found in the Appendix. If syntax evolved gradually, through several stages, then it is plausible to expect that modern syntactic structures and operations decompose into evolutionary primitives. If so, this will be measurable in the activation of the brain.

If the brain co-evolved with language/syntax, then the pressures to use ever more complex syntax contributed to the strengthening of necessary neural connections, and with it some specific processing strategies. According to Deacon (2003: 86–7), if language structure arose in a drawn-out coevolutionary process in which both brain and language structures would have exerted selection pressures on one another, then “we should expect to find that human brains exhibit species-unique modifications that tend to ‘fit’ the unique processing demands imposed by language learning and use.” As noted by many, including Deacon (1997) and Diller and Cann (2013), not all parts of the brain increased at the same rate, but Broca's areas and other language processing areas increased more than proportionately. According to Diller and Cann (2013: 253), “in biology we expect form and function to evolve together.” In other words, if certain processing strategies evolved more recently in order to support e.g. layered syntax, then it is expected that such strategies would exhibit a particularly good fit for the function of processing such syntactic structures.

2.5.4 *Genetics and the FOXP2 gene*

Genetics is another area of great interest to the evolutionary considerations. A gene has recently been identified, the FOXP2 gene, which is taken to play a role not only in articulation, but also in the processing of (morpho-)syntax. The symptoms of the affected members of the KE family (those who have a mutation) include simplified morpho-syntax (e.g. Gopnik and Crago 1991), potentially implicating problems with building functional categories and projections, including tense and TP (see also Piattelli-Palmarini and Uriagereka 2011; also some discussion in Tallerman 2013a). The specific symptoms involve subject drop and the nonsystematic use of plural

forms and tense (Gopnik and Crago 1991, and references cited there). While Diller and Cann (2012: 171) consider that “it would seem likely that FOXP2 is more important for . . . vocalized speech than for something as complex as grammar,” they add that “speech and certain aspects of grammar . . . are closely related to each other from the standpoint of human neural function,” and that “the KE family . . . has a disruption of both speech and certain aspects of grammar.”

This may suggest that the affected KE family members experience difficulties establishing neural connections necessary for connecting multiple layers of structure, in a manner similar to agrammatic speakers (Section 2.5.2); see also the discussion below. In an fMRI experiment (Liégeois *et al.* 2003), the unaffected KE family members showed a typical left-dominant distribution of activation involving Broca’s area, whereas the affected members showed a more posterior and more extensively bilateral pattern of activation, as well as significant underactivation in Broca’s area and its right homologue. This may suggest that they are relying on alternative processing strategies, possibly those better suited for processing paratactic language.

According to Enard *et al.* (2002), there is evidence for positive selection of the gene by humans, which would render this discovery of relevance for the evolution of language. Diller and Cann (2009; 2012: 171) estimate that the FOXP2 mutation dates back to 1.8 to 1.9 mya (million years ago), approximately the time when *Homo* (*Homo habilis*, *H. ergaster*, and *H. erectus*) emerged, and when the hominin brains began to triple in size. According to Diller and Cann (2012: 171), this would be consistent with symbolic speech, grammatical language, and the spectacular brain growth evolving together.

FOXP2 is just one of several genes that are implicated in language and speech (disorders), and are thus of potential relevance for language evolution (see e.g. Newbury and Monaco 2010). Two other potentially relevant genes are CNTNAP2 and ASPM (Diller and Cann 2012; see Dediu and Ladd 2007 for ASPM and *Microcephalin*).²⁸ In order to actively engage this and any other relevant future findings in genetics, we linguists will have to come up with some concrete linguistically-based hypotheses about how language evolved. Without that, these remarkable findings in genetics will go untapped.

To suggest just one possible track, some recent experiments indicate that the specifically human FOXP2 mutations are responsible for increasing synaptic plasticity and for establishing better connectivity among neurons in the brain (e.g. Vernes

²⁸ According to Christiansen and Chater (2008), human genome-wide scans have revealed evidence of recent positive selection for more than 250 genes (Voight, Kudravalli, Wen, and Pritchard 2006), making it very possible that genetic adaptations for language would have continued in this scenario. According to Hurford and Dediu (2009: 179), there is “genetic diversity across the human species and each gene has a different history.” See also Levinson and Dediu (2013). Fitch (2010: 503) observes that if “widespread allelic variations turn out to correlate with subtle linguistic differences, as suggested by Dediu and Ladd (2007), genetic data may help resolve such debates in the coming decades.”

et al. 2007; Enard *et al.* 2009: 968). This contributes to the enhanced capability of cortico-basal ganglia circuits in the human brain that regulate critical aspects of language, cognition, and motor control (Lieberman 2009). One can thus hypothesize that the FOXP2 mutation was selected, in part, in order to facilitate the processing of syntax.

2.5.5 Stratification accounts elsewhere

The proposal in this chapter considers that the complexity in clausal structure arose through the imposition of one layer of structure upon another, that is, by superimposing a layer of TP over the layer of a small clause. It is worth pointing out that stratification accounts have also been proposed for brain evolution in general, where newly emerged patterns are considered to become dominant and “rework”/subordinate older patterns into conformity with them (e.g. Rolfe 1996; Vygotsky 1979). Vygotsky (155–6) states that “brain development proceeds in accordance with the laws of stratification of construction of new levels on old ones... Instinct is not destroyed, but ‘copied’ in conditioned reflexes as a function of the ancient brain, which is now to be found in the new one.”²⁹ A repeated theme in Piaget’s work is the inclusion of attainments of earlier stages in the structures of later stages (Gruber and Vonèche 1977: xxiii). From this perspective, small clause structures can be seen as the older/lower structures, which are retained in, and subordinated to, the newer/higher sentential TP structures.³⁰

The notion of the triune brain also invokes the idea of evolutionary layering and subordination. According to Isaacson (1982: 1, 240), following Broca (e.g. 1878), the inner lobe of the brain is organized into two layers: the inner and phylogenetically oldest ring (allocortex) and the outer limbic ring (transitional cortex). The lowest, protoreptilian brain involves ancestral learning and memories, which are subjugated by the higher limbic brain, thus allowing forgetfulness and suppression of the protoreptilian habitual way of responding (MacLean 1949: 240–2, 247). In turn, rational decision making is associated with the prefrontal cortex, or yet-higher brain (Strickberger 2000: 506).

In his characterization of symbolic reference, Deacon (1997: 300) argues that each higher-order form of a representational relationship must be constructed from, or decomposed into, lower levels of representation, in such a way that indexical reference depends upon iconic reference, and symbolic reference in turn depends upon indexical

²⁹ As put in Bickerton (1998: 353) “the creation of a new neural pathway in no way entails the extinction of the previous one. The fact that we remain capable of functioning in the protolinguistic mode... indicates the persistence of the older link.”

³⁰ A rather concrete example of evolutionary layering and recency dominance comes from the adaptation that led to black coloration in leopards, which still preserves the previous layer of orange spots (Carroll 2005). Metaphorically speaking, the small clause grammar can be seen as orange spots still lurking through the layer of the more recent, dominant black coloration of sentential/TP speech.

reference. Deacon (453) concludes that a failure to appreciate the constitutive role of lower forms leads to a perspective that “kicks the ladder away after climbing up to the symbolic realm and then imagines that there never was a ladder in the first place.”

2.6 Conclusion

In the evolutionary proposal given in this chapter, Tense and TP (and higher projections, such as CP) did not emerge from scratch, but were superimposed upon what was already there—the small clause layer—allowing small clauses to survive, but only in marginalized, subordinated roles. This kind of incremental building of clausal structure is arguably also evident in language acquisition (Section 2.5.1). The above established quirky (rather than optimal) properties of modern clauses, attested crosslinguistically, begin to make sense if they are seen as by-products of evolutionary tinkering.

Relying on the stable postulates of syntax, that TPs are built upon the foundation of small clauses, one naturally arrives at the small clause stage in language evolution by a method of internal reconstruction. By removing the TP layer of the clause, one can get down to the SC layer. This same method of reconstruction will be used again in the next chapter to reconstruct an intransitive stage in the evolution of syntax, by peeling away the vP layer, associated with agents and transitivity. The proposal in the next chapter also sheds light on various other puzzling properties of language design, including unaccusativity and ergativity. Chapter 7 demonstrates how the property of displacement, a design feature of human language, is supported by more complex grammars.

The intransitive two-word stage: Absolutives, unaccusatives, and middles as precursors to transitivity

3.1 Introduction: The two-word stage

The previous chapter discussed (root) small clauses, which were argued to be evolutionary precursors to more complex (TP) counterparts, with both still in use to varied degrees in present-day languages. It is of note that all the small clause data included in Chapter 2 involved intransitive clauses, that is, clauses with a subject but no object. While small clauses in present-day languages can definitely be transitive, my argument is that the proto-grammars in the paratactic (non-hierarchical) stage were intransitive.¹

There are many reasons to postulate that proto-syntax started intransitive. First of all, children's language acquisition proceeds through a two-word stage, as noted by many (e.g. Bloom 1970); a two-word stage can accommodate a predicate with only one argument, and thus cannot be transitive, at least not without positing various null categories in order to bridge the gap between adult grammars and early child grammars.² Similarly, early stages of sign languages constructed from scratch also seem to show a two-word, intransitive stage, as discussed below. Next, many fossils of proto-grammars are intransitive two-word structures, including certain compounds and unaccusative and passive-like small clauses (see also Chapter 2).

¹ The following example of a TP-less incredulity small clause is transitive, containing both a subject (*him*) and the object (*his wife*). Just like the intransitive small clauses from the previous chapter, this example lacks tense, agreement, and structural nominative case, as well as shows the other properties of small clause syntax:

- (i) Him leave his wife?! (That is not possible!)

On the other hand, the unaccusative data from Serbian, as well as the passive-like (*Problem solved*) and verbless (*Me first!*) small clauses from English, are necessarily intransitive in the sense that only one argument can be structurally realized.

² Section 2.5.1 in Chapter 2 offers some discussion of the so-called Continuity Hypothesis, which posits that all the relevant categories in adult language are also there in child language, but are just null or covert.

In addition, paratactic combinations of (small) clauses are almost always binary, merging only two clauses at a time (1–2). Thus, two-word grammars creating a (small) clause are paralleled by “two-clause” grammars:

- (1) Nothing ventured, nothing gained.
- (2) Come one, come all.

Combining more than two paratactic phrases/clauses typically leads to a processing quagmire, as the following example helps illustrate:

- (3) No come, no money, no shelter.

This example is an expanded version of attested binary examples from pidgin languages, such as “No mani, no kom” from Hawaiian Pidgin English (Winford 2006). Unlike the relatively clear message behind “No money, no come,” it is hard to know how to interpret (3). Is it that if you do not come, then you cannot get paid, or get any shelter? Or does it mean that if you do not come with the money, then you will not get any shelter? Or is it a prediction or a threat that you won’t come, won’t get the money, and won’t get any shelter either? The grammar on its own cannot decide among these options.

This is not just an example involving the familiar kind of ambiguity, as found in e.g. “He saw the man with the binoculars,” where language users typically reach for one interpretation and do not even consider the other(s). With the one in (3), we are at a loss right away. It seems that our brains are just not prepared to readily assign meanings to paratactic ternary structures such as (3). But we can handle binary structures.

In Minimalism (e.g. Chomsky 1995) and predecessors, the central combinatorial operation Merge is widely considered to be binary, that is, it is considered that Merge can combine only two elements at a time (see e.g. Kayne 1984). The same assumption holds for the operation Adjoin, which is akin to paratactic attachment (see Chapter 4).³ As a consequence of binary Merge, it is considered in Minimalism and predecessors that binary branching is a syntactic universal, characteristic of all languages. To be more accurate here, because it was empirically determined/discovered that the vast majority of syntactic structures across languages can be analyzed as involving binary branching, the operation Merge was hypothesized to only be able to combine two words/phrases at a time.

³ Very roughly speaking, operation Merge creates a headed structure, given that one of the merged elements determines the category of the newly-created constituent. For example, in merging a Tense element and a verb phrase, one creates a Tense Phrase, with Tense acting as the syntactic head. In contrast, with operation Adjoin, which serves to attach e.g. adverbials, neither of the merged elements is treated as a syntactic head (for discussion, see e.g. Adger 2003). For example, an adverb such as *quickly* can attach to a vP, expanding that vP, but not creating a new headed structure. I return to the distinction between the two operations in Chapter 4.

If so, then the initial proto-syntax, characterized by parataxis, could not have been transitive in the modern sense of the word, given that transitivity involves three obligatory constituents (subject, verb, object), and accommodating three such constituents structurally would require hierarchical syntax.⁴ At least this is the claim in Minimalism: on top of the small clause (or VP layer) in transitive structures one must project another verbal layer, the layer of vP, as discussed later in the chapter. If, as I argue, proto-syntax did not have hierarchical capabilities, then it could not have had true transitivity.

But, can there be languages without transitivity? How would one express the basic notions such as “who does what to whom” in such languages? At first glance, such grammars might seem impossible to imagine. However, as will be shown in this chapter, there are many constructions in present-day languages that exhibit exactly such non-transitive properties.

A good initial illustration is provided by the emergence of Nicaraguan Sign Language (NSL) by deaf children in the 1970s and 1980s, to be discussed further in Section 3.5 (see also Aronoff *et al.* 2008 for Al-Sayyid Bedouin Sign Language, which exhibits similar properties). According to Kegl, Senghas, and Coppola (1999: 216–17), the earliest stages of NSL, with the first generation of speakers, do not utilize transitive N V N constructions, such as (4), at least not when both nouns are animate (Senghas *et al.* 1997). Instead, the speakers resort to a sequence of two intransitive clauses, an N V—N V sequence (5–6), clearly resembling the paratactic structures in (1–2):

- (4) *WOMAN PUSH MAN.
- (5) WOMAN PUSH—MAN REACT.
- (6) WOMAN PUSH—MAN FALL.

Focusing on (6), one can say that the sign for WOMAN is the subject of PUSH, but the sign for MAN here is not the object of PUSH, but instead the subject of FALL. In this kind of grammar, there are no structural objects, as these structures are intransitive.⁵ Similar considerations hold for Homesign syntax, as reported in e.g. Goldin-Meadow (2005), to be discussed in Section 3.5. But, one can argue, this may just be a phenomenon of early stages of sign languages, and nothing like that is possible in spoken languages.⁶

⁴ This property of language, that its structures are necessarily binary-branching, may partly be a consequence of the paratactic beginnings of language, and the processing constraints to which such paratactic grammars seem to be subjected (see the discussion regarding the example in (3)).

⁵ One must also appreciate the relativity of the notions subject and object, to be discussed further in this chapter: whether MAN/WOMAN in the above examples is subject-like or object-like depends on the choice of the verb.

⁶ A reviewer has wondered why the acquisition of these sign languages is relevant for language evolution. As pointed out for the same question raised for language acquisition in general (Section 2.5.1), my approach postulates that the foundational layers of syntax need to be in place before one can build more

However, this chapter will go over a variety of present-day structures which blur the subject/object distinction in this same way. One example of this kind of grammar is the so-called exocentric VN compounds, which necessarily consist only of two words (i.e. two free morphemes), a verb and a noun, resembling small clauses (see Section 3.3.2 for more details). If Givón's (1971) well-known slogan "today's morphology is yesterday's syntax" has some truth to it, then it provides additional support for the claim that the mold these compounds are poured into may be just fossilized syntax of an earlier era. One more recent example of a compound which preserves a stage of English syntax is the name for the plant *forget-me-not*. While English speakers no longer use this kind of syntax in sentences (e.g. **You forgot me not*), it is preserved in this particular compound.⁷

In the underlined compounds in (7) the noun is subject-like, while in the rest of the compounds it is object-like, as discussed below.

- (7) scare-crow, kill-joy, pick-pocket, cry-baby, cut-purse, busy-body,
spoil-sport, turn-coat, rattle-snake, hunch-back, dare-devil,
wag-tail, tattle-tale, saw-bones, cut-throat, Burn-house, Love-joy,
Pinch-penny (miser), sink-hole, turn-table

Even though these compounds contain a verb, and the verb takes one argument (the noun), which is typically object-like, it would be wrong to analyze such compounds as transitive. First of all, clearly, there is no second argument in these compounds, which would count as a subject. Also, the noun is not necessarily object-like, but can also be subject-like, as is the case with the underlined compounds. While a *scarecrow* is somebody who scares crows (crow is object-like), a *rattlesnake* is a snake that rattles (thus subject-like), and a *cry-baby* is a baby (or somebody) who cries (again subject-like). But the nouns in both of these cases appear in exactly the same position and the same form in the compound, following the verb, and thus there is no formal differentiation between object-like and subject-like arguments in this sense. This is quite comparable to the clauses characterizing early stages of Nicaraguan Sign Language, as illustrated above in (5–6). The VN compounds in other languages,

complex layers. If the acquisition of a sign language proceeds in stages, then these stages are expected to be consistent with the postulated scaffolding.

⁷ According to a reviewer, Givón's slogan is controversial. However, my approach does not use Givón's slogan as a reconstruction method, but rather just to give an extra dimension to the claim that (verbal) compounds may have preserved a very old stage of syntax. In this respect, Anderson (1988) discusses Givón's slogan and concludes that while "it is impossible to identify all of today's morphology with yesterday's syntax" (338), "there is every reason to believe that much morphology does in fact represent the reanalysis of earlier syntactic complexity" (340), even though the relation between the two is not simple and direct (see also Lightfoot 1979). According to Lightfoot (1979: 160), "the morphology is notoriously slow to adapt to changing syntax" and may reflect syntactic patterns of great antiquity. If true, then this can be helpful for my proposal, which attempts to reconstruct the earliest stages of human syntax.

including Serbian, show exactly the same properties in this respect, as discussed in detail in Chapter 6.

Furthermore, the intransitive constructions in some modern ergative languages share this property as well. In these languages, the subject of the intransitive clause is structurally not distinguishable from the object, both appearing in the so-called absolutive case, as illustrated in the following example from Tongan (Austronesian language spoken in Tonga; Tchekhoff 1979: 409):⁸

- (8) 'oku kai 'ae iká.
 PRES eat the_{ABS} fish
 'The fish eats.'
 'The fish is eaten.'

As the two distinct translations indicate, the only argument (the fish) can be interpreted here as either the subject or the object of eating, once again illustrating an intransitive grammar which does not make a formal distinction between subjects and objects. As pointed out in Tchekhoff (1973), as well as by other researchers (e.g. Authier and Haude 2012; Blake 1976; Mithun 1994: 247; Shibatani 1998: 120), the subject/object distinction does not play a role in such ergative/absolutive patterns, especially those which are both syntactically and morphologically ergative, as will be explained below. In addition to these, several other absolutive-like constructions found in present-day languages, in fact languages classified as nominative-accusative, will be considered in this chapter, including unaccusatives, nominals, and middles.

The main proposal in this chapter is that the initial paratactic (non-hierarchical) grammars were intransitive grammars, whose clauses consisted of just two (proto-) words. In this proposal, transitivity is seen as an innovation brought about by superimposing an additional layer of structure (perhaps the vP layer of Minimalism) upon the foundational (absolutive) layer, with some intermediate "middle" constructions paving the way toward transitivity. Not only can this approach shed light on the ergative-absolutive and nominative-accusative dichotomy found across today's languages, but it can also explain the availability of the foundational absolutive-like patterns in various guises in primarily nominative-accusative languages. The recurring theme of this monograph is that each stage preserves, and builds upon, the

⁸ While _{ABS} does not appear in the gloss in the original, I have added it here because this would be typically considered as absolutive case. Tchekhoff calls it the "first modifier," as opposed to the "second modifier," which corresponds to an agent (ergative case).

Interestingly, as reported by Haiyong Liu (p.c. 2013), Chinese shows similar vagueness of expression, especially when the perfective particle *le* is used (see also Section 3.3.3 for comparable data from Riau Indonesian).

- (i) Ji chi le.
 chicken eat PERF
 'The chicken(s) have/has finished eating.'
 'The chicken was eaten.'

achievements of the previous stage(s). In this case, the proposal is that transitive structures (vP shells), as well as middles, are built upon the foundation of intransitive (absolutive-like) VPs (or small clauses), shedding light on a host of quirky phenomena across languages.

As was the case with the small clause proposal in Chapter 2, this proposal also involves an internal reconstruction based on the theoretical postulates within Minimalism. Just as one can peel the TP layer off a modern sentence (Chapter 2), one can also peel off the vP layer, resulting in intransitive small clauses. Recall that the reconstruction method used in this book is based on the hierarchy of functional projections which allows a SC/VP to be composed without a TP or vP, but does not allow either a vP or a TP to be composed without a VP/SC. This renders the proposed progression of stages theoretically plausible.

In the process of evolving transitivity, i.e. grammaticalizing the syntactic positions of more than one argument, I propose that there are/were various types of intermediate steps, as discussed in Section 3.4. The evidence for these intermediate stages includes various “middle” constructions, which straddle the boundary between transitivity and intransitivity, passives and actives, as well as neutralize the distinction between subjects and objects. I exemplify this with *se* middle constructions to be introduced below, where *se* is analyzed as a meaningless proto-transitive marker.

As with the analysis of small clauses in Chapter 2, the argument for the proposed progression through stages (absolutive, to middle, to transitive) has three prongs to it: (i) evidence of “tinkering” with the language design, so that fossils of one stage provide foundation for the next, possibly through intermediate steps; (ii) identifying “living fossils” of each stage in modern languages; (iii) existing or potential corroborating evidence. Moreover, the goal is to show that each identified stage accrues concrete and tangible advantages over the previous stage(s), advantages that are significant enough to be targeted by natural/sexual selection.

In this respect, Section 3.2 shows how intransitive absolutive-like structures get built into the transitive (vP) structures, thus providing evidence of evolutionary tinkering with the language design. Section 3.3 introduces further living fossils of the postulated absolutive-like stage in the evolution of syntax. Section 3.4 considers middle constructions and serial verb constructions, both of which straddle the boundary between intransitivity and transitivity. There is also some corroborating evidence for an intransitive stage, as well as potential testing grounds, as discussed in Section 3.5.

3.2 Intransitive absolutives

This chapter postulates a stage in the evolution of syntax in which only intransitive absolutive-like patterns were available, i.e. patterns in which a verb takes only one argument, and in which the distinction between subjects and objects is neutralized, in fact, irrelevant. This is the sense in which I am using the term “absolutive-like” in this

context, just to indicate that an intransitive structure does not distinguish subjects from objects grammatically. This is not to imply in any way that there was a special marking of an ergative argument, to contrast with the absolutive one. My proposal is that this intransitive proto stage could only have one argument per clause. From there, one can see how ergative and nominative languages would have diverged in the way they express additional arguments in sentences. Ergative languages would have kept the absolutive pattern for intransitive sentences, but added ergative arguments to this absolutive structure in order to express transitive patterns. On the other hand, nominative-accusative languages would have developed a special, accusative case only for the lower argument, establishing a category of the object. It could be that certain middle constructions in the latter languages paved the way toward developing the accusative case, as discussed in Section 3.4.2.

It should be pointed out that this is a very different view from the one that would advocate missing or null arguments. In this analysis, one is dealing with a two-slot grammar with only one argument slot, and there is nothing missing or null syntactically speaking.⁹ This is a perfectly coherent grammar, even if simpler than e.g. transitive grammars. Developing such a grammar would have constituted an enormous advantage over no grammar at all, but this kind of grammar has less expressive power than a fully transitive grammar, exactly the kind of scenario that would allow evolutionary forces such as natural selection to operate (see Chapters 2, 4, and 7). Pressure to accommodate additional arguments would have been a powerful driving force behind the evolution of more complex (transitive) patterns.

This proposal is entirely consistent with the analysis of transitivity in e.g. Minimalism, where transitivity is considered to involve an additional layer of verb structure, a vP shell (e.g. Chomsky 1995). In this analysis, the internal (lower argument) is generated in the VP (or SC), and the external argument (e.g. agent) in the vP (9–10), as discussed in Section 1.7.

(9) Maria will roll the ball.

- (10) a. [_{SC/VP} roll the ball] →
 b. [_{vP} Maria [_{SC/VP} roll the ball]] →
 c. [_{TP}: Maria will [_{vP} Maria [_{SC/VP} roll the ball]]]

In deriving the sentence in (9), one starts with the basic, small clause layer in (10a). Then, the agent (Maria) is merged in the higher vP layer (10b), which is responsible

⁹ Bickerton (1990, 1998) discusses pidgin languages, as well as child language, in the light of language evolution, and concludes that these systems are not real languages. One of the reasons why these systems are not treated as “real” language in Bickerton’s work is that they do not realize all the arguments that seem to be obligatory in adult speech (see the discussion in Section 1.6). However, given that constructions with “missing” arguments are also prevalent in adult languages, one cannot really conclude that this is not “real” language. Instead, my argument is that languages are composites encompassing structures of various degrees of syntactic layering, reflecting different stages in the evolution of human language.

not only for accommodating this additional argument, but also for assigning (abstract) accusative case to the object (the ball). Finally, the TP layer is projected on top of the vP layer, and “Maria,” the highest argument, moves to become the subject of the TP (10c).

Thus, just as is the case with the small clause vs. TP distinction discussed in Chapter 2, here as well we have a layer of structure (vP) superimposed upon the foundational, absolutive (small clause) layer. In both cases, the small clause with one argument is the foundation. In more elaborate grammars, full transitive sentences will have all three layers, arranged in a hierarchy of projections (see e.g. Abney 1987):

- (11) TP > vP > SC/VP.

Assuming this kind of structure building in Minimalism, my proposal in fact does an internal reconstruction to arrive at the intransitive small clause proto-syntax, as proposed in Chapters 1 and 2, and repeated below:

Internal reconstruction of clause structure (based on Minimalism)

A structure X is considered to be (evolutionary) primary relative to a structure Y if X can be composed independently of Y, but Y can only be built upon the foundation of X.

This hierarchy of functional projections is an influential theoretical construct, with good empirical foundation, and it is significant that it can be used to reconstruct proto-syntax.

While Chapter 2 provided evidence for living fossil structures without a TP, my focus in this chapter is on the fossil structures without vPs. In fact, intransitives, especially unaccusatives (see Section 3.3.1), can be accommodated without the vP layer (12–13), as discussed in Section 1.7. In other words, the vP layer is optional.¹⁰

- (12) The ball will roll.

- (13) a. [_{SC/VP} roll the ball]
 b. [_{TP}: The ball will [_{SC/VP} roll ~~the ball~~]]

Given that there is no agent, and no accusative case either, the vP shell need not project in (13a). In English, the object-like argument (the ball) has to move to the TP projection and become a structural subject (13b).¹¹

¹⁰ Recognizing that vP is an optional layer means that the hierarchy TP > vP > SC/VP has to be seen in the following way. The SC/VP serves as necessary foundation for all clausal constructions. Transitivity (vP) must have a SC/VP as its foundation. TP, on the other hand, must have either the SC/VP or the vP as its foundation. If both vP and TP are present, then the TP will dominate vP. Because vP is considered to be just a shell, another layer of the verb phrase, then a unified generalization for TP is that it has to be built upon the foundation of a verbal layer.

¹¹ One exception in English are fossil structures such as the underlined small clause in (i), in which the subject does not move, and which closely parallels the structure of the unaccusative small clauses in Serbian, discussed below in the text (see also Chapter 2).

- (i) Come winter, he will go to Florida.

The verbs like *roll*, which participate in both transitive and intransitive patterns, clearly show fluidity in the expression of subjecthood (see also Sections 1.7 and 3.4). Observe that (9) and (12) start with exactly the same foundation, the small clauses in (10a) and (13a), respectively. Whether *the ball* will be the object or the subject of the sentence depends on whether or not there is an additional argument. What counts as a subject is thus relative to the number of arguments expressed.¹²

Recall from Chapter 2 that in the absence of the TP layer in unaccusative small clauses in Serbian of the kind in (14), only one layer of structure is available, the [SC/VP] layer:

- (14) [_{SC/VP} Pala vlada.]
 fell government

In conjunction with the examples above, we see a gradual progression toward more syntactic complexity, from one single layer of structure in (14), to two layers of structure in English tensed unaccusatives (13), to three layers of structure with English tensed transitive clauses (10c), abstracting away from some other functional projections that may be there. Crucially, this gradual increase in complexity is arrived at not through impressionistic means, but by a precise method of internal reconstruction based on theoretical considerations.

Grammaticalizing transitivity in e.g. nominative-accusative languages, with a structural accusative case and the vP/VP shell, would not have precluded some other structures (e.g. unaccusatives, *se* clauses, nominals, compounds) from retaining the absolutive-like flavor. If these simpler grammars are easier to process, then their retention at least in some constructions is to be expected.

This section has shown that intransitive (absolutive-like) structures get built into the transitive vP shells, providing the necessary foundation for transitivity, thus offering evidence of evolutionary tinkering with the language design. The following section introduces further types of living fossils of the postulated absolutive-like stage in the evolution of syntax.

3.3 More on living fossils: What is it that unaccusatives, exocentrics, and absolutives have in common?

In this section I consider in more detail the following “living fossils” of the postulated absolutive-like stage in the evolution of human language: unaccusatives (Section 3.3.1), exocentric VN compounds (Section 3.3.2), absolutives in ergative-absolutive languages

¹² Of note is also that Borer’s (1994) fully configurational approach to argument linking assumes that the arguments within the VP are hierarchically unordered, and that there is no lexical distinction between subjects and objects inside the VP. Such distinctions can only be made with the help of the functional projections, such as vP. This is consistent with the proposal in this monograph that the foundational small clause layer of structure is non-hierarchical and absolutive-like.

(Section 3.3.3), as well as (other) absolutive-like constructions found in nominative-accusative languages, including nominals and dative subject clauses (Section 3.3.4).

3.3.1 Unaccusatives

Unaccusative small clauses were introduced in Chapter 2, where the focus was to establish that such clauses are structures without a TP layer, showing neither Move nor subordination. What is relevant about them in this chapter is that they are intransitive structures which can be generated without projecting the vP layer either. This kind of grammar is a good approximation of the hypothetical two-word stage, as discussed in Section 3.1, as well as in Chapter 2. Moreover, this kind of grammar is reminiscent of the grammar found in exocentric VN compounds, as discussed further in Section 3.3.2, as well as in Chapter 6.

As pointed out in Section 3.2, unaccusatives can be accommodated without projecting the vP layer:

(15) [_{TP}: The ball will [_{SC/VP} roll/fall ~~the ball~~]]

Recall that vP is projected primarily in order to accommodate an additional argument, typically the agent, as well as the accusative case, but unaccusative structures have only one argument and no accusative case (hence their name). Unaccusatives can be roughly characterized as intransitive structures whose sole argument is typically a theme, showing some object-like properties, including the postverbal position in some cases (see e.g. Perlmutter 1978; Burzio 1981; Levin and Rappaport Hovav 1995, for crosslinguistic manifestations and characterizations).

In Serbian, for example, there is a clear preference for unaccusative “subjects” to follow the verb, the position typically associated with objects. If these unaccusatives are at the same time TP-less small clauses (e.g. 16), this preference becomes more rigid, with strong preference for the otherwise non-canonical VS order (see Progovac 2008a,b for details):

- (16) a. Pala vlada.
 fall.PART government
 ‘The government has (just) collapsed.’
 b. Proš’o voz.
 gone.PART train
 ‘The opportunity has passed.’

This provides support for the unaccusative analysis under which the “subjects” of the unaccusative verbs (e.g. *arrive*, *fall*, *come*, *appear*) Merge as “objects” of the small clause (e.g. Burzio 1981).

Recall that unaccusative small clauses in Serbian are analyzed as involving one single layer of structure, (SC/VP) layer, and that their subjects thus have no syntactic position into which to move (Chapter 2; see also Section 3.3):

(17) [SC/VP Pala vlada]

Without a vP or TP layer, these are just rigid and flat two-word structures, reasonably good approximations of the postulated two-word stage.¹³

Given this proposal, the unaccusativity phenomenon can be seen as an option to retain (elements of) absolutive-type grammars in constructions which can be supported by such grammars, e.g. intransitive constructions with a single (internal) argument (Casielles and Progovac 2010, 2012).¹⁴ To put it another way, if proto-syntax involves less grammatical burden, and is less costly to process, then one can expect to find it in constructions in which more complex grammars do not confer much advantage. Transitive constructions, as well as intransitive constructions involving agents in some languages, may need extra syntactic space, e.g. a vP shell, and thus cannot be expressed as readily with this type of grammar.

Intransitive absolutive constructions in ergative languages, as discussed in Section 3.3.3, as well as various absolutive-like constructions elsewhere, are again structures which blur the distinction between subjecthood and objecthood in the sense that their only argument has characteristics of both.¹⁵ The only difference seems to be that unaccusatives tend not to encompass agents, and this may be due to the special status agents have acquired in nominative-accusative languages, possibly by being associated with their own functional projection, such as vP in Minimalism. In other words, even if there is an association of the role of agent with the vP in some modern languages today

¹³ A reviewer wonders why this stage could not have had a noun phrase in lieu of the noun, combining with the verb, resulting in a multiple-word stage. Perhaps this kind of complexity, involving modification, arose only later, as it would have created an asymmetrical structure. Also, the typical modifiers of nouns, adjectives, would have evolved in a later stage, given Heine and Kuteva's (2007) reconstruction, and considering that not all languages distinguish the category of adjectives.

¹⁴ As pointed out in Section 1.6, Casielles and Progovac (2010, 2012) explore the connection between unaccusatives andthetic statements. According to e.g. Marty (1918), categorical judgments (also referred to as *double judgments*) involve two successive acts (choosing an entity and making a statement about it) and are expressed by the traditional subject-predicate sentences (*Vlada je pala* '(the) government has collapsed'). In contrast,thetic statements or *simple judgments* merely assert a state of affairs where a new situation is presented as a whole. In these statements the entity involved in the event forms a unit with it (*Pao sneg* 'Fell snow'). There is a lot of overlap betweenthetic and unaccusative grammars. It would stand to reason that grammars which generatethetic statements are evolutionarily more primary, as well as simpler. In this respect, Gil (2012) has proposed that predication is a composite emergent entity, rather than a primitive.

¹⁵ Comrie (1978) has made an argument that subjecthood across languages is not a rigid notion, but a notion on a continuum. This can be accommodated within the evolutionary scenario explored here, according to which this distinction was not there at all in the first stages of proto-syntax.

In Minimalism, subjecthood is characterized structurally/mechanically, based on the position of the phrase, as well as on its agreement properties. Thus, very roughly speaking, if a phrase (in English) occupies a certain syntactic position (e.g. a specifier position of a TP), and/or if it agrees with the Tense element, then it is considered to be the subject, descriptively speaking. But in fact whether or not we call this phrase a subject matters very little in this syntactic theory. Thus, the fluidity of the concept of subjecthood does not seem to pose a problem for this theory. Where the problems lie is in the attempt to rigidly associate specific thematic roles with specific syntactic positions, as addressed from this perspective in Progovac (2014b).

(but see Progovac 2014b), this association was certainly not there in the two-word grammar stage. What the two phenomena have in common, absolutes and unaccusatives, is the unavailability of the accusative case, that is, the structural case which is reserved only for objects.¹⁶

3.3.2 *Exocentric compounds*

Another phenomenon that is difficult to explain given the postulates of modern morpho-syntax are exocentric VN compounds of the kind illustrated in (18–19) below for English and Serbian. However, their shape makes sense if they are seen as fossils closely approximating a two-word absolute-like (intransitive) stage in the evolution of human language (see Progovac and Locke 2009; Progovac 2009a, 2012).

- (18) scare-crow, kill-joy, pick-pocket, cry-baby, spoil-sport, turn-coat, rattle-snake, hunch-back, dare-devil, wag-tail, tattle-tale, drynk-pany (drink-penny; miser (a surname)), pinch-penny (miser), sink-hole, turn-table, busy-body
- (19) ispi-čutura (drink.up-flask—drunkard), guli-koža (peel-skin—who rips you off), cepi-dlaka (split-hair—who splits hairs), muti-voda (muddy-water—trouble-maker), jebi-vetar (screw-wind—charlatan), vrti-guz (spin-butt—fidget), tuži-baba (whine-old.woman; tattletale), pali-drvice (ignite-stick, matches)

The grammar behind these compounds is quite simple: it is a two-place mold that can fit exactly one verb and one noun, whether the verb is semantically monovalent or bivalent. Moreover the thematic role of the noun is underspecified. While the noun in these compounds is often interpreted as an internal argument, corresponding to an object in a sentence, it can also be external, corresponding to a subject in a sentence, as is the case with the underlined compounds in both languages. As pointed out in Section 3.1, the noun in *crybaby* is subject-like, while the noun in *scarecrow* is object-like.

Once again, the grammar behind these compounds provides no morpho-syntactic differentiation between subjecthood and objecthood, leaving room for vagueness. For example, a *rattlesnake* is conventionally interpreted as a snake that rattles, but one can imagine this word also used for somebody who routinely rattles snakes, on

¹⁶ It follows from this proposal that proto-clauses did not have structural case, whether accusative or nominative, as discussed in Chapter 2. In Minimalism, structural nominative case is associated with the functional projection of TP, and structural (accusative) case with the projection of vP. While nominative and accusative noun phrases can have different morphological manifestations (e.g. *he/who* vs. *him/whom* in English), the syntactic theory considers that even without such overt manifestations, there are abstract case relationships between Tense (TP) and nominative, and between the light verb (vP) and the object in the accusative-type languages.

analogy with e.g. *pick-pocket*.¹⁷ Notice that a more complex compound, *snake-rattler*, which has a transitivity layer, is no longer vague in this way, and can only be interpreted as somebody who rattles snakes.

Perhaps a better way to make this point would be to consider a contrast between a *turn-coat* and a *turn-table*. Conventionally, a *turncoat* is somebody who turns his coat/skin inside out (traitor), with the coat being object-like. On the other hand, a *turntable* is a table that turns, where the table is subject-like. But if a *turntable* can be a table that turns, then, in principle, grammatically speaking, a *turncoat* could be a coat that turns, perhaps a coat that is reversible. Likewise, if a *turncoat* can be somebody who turns his coat, then, in principle, a *turntable* could be someone who (routinely) turns tables upside down, perhaps a rowdy regular in a bar. Again, this flexibility is not there with syntactically more elaborated compounds, such as *table-turner*, which cannot mean, not even in principle, a table that turns.

Exocentric VN compounds can thus be seen as absolutive-like constructions which blur the distinction between subjecthood and objecthood, and which also lack accusative case, the properties these compounds share with unaccusatives and (other) absolutives.

It is of interest that exocentric VN compounds across languages seem to specialize for derogatory reference when referring to humans, possibly implicating their original use in ritual insult. Chapter 6 explores the proposal that the ability to create such compounds in the distant evolutionary past may have been sexually selected, contributing to the consolidation of proto-syntax, as well as to vocabulary building.

As pointed out by a reviewer, there are many other compound types in English, combining other categories, such as an adjective and a noun (*blackbird*), a noun and a noun (*snowman*), a noun and an adjective (*sky-blue*). There are several reasons why they are not considered in this monograph, although future research might reveal relevance of some of these for evolutionary considerations, perhaps compounds of the *egghead* type. First of all, even though N-N compounds in English may seem simple and straightforward at first sight, they are typically not only headed (the second element is the syntactic and semantic head of the whole compound), but they are also recursive, producing: *styrofoam snowman*, or *policy committee decision*

¹⁷ Some compounds can even be simultaneously doubly interpreted in this respect: Serbian *pali-drvice* (ignite-stick, matches) is at the same time a stick that ignites and a stick that gets ignited. In this case, the vagueness is quite expressive and appropriate. Precision is not always desirable, and this can provide partial explanation for the persistence of vague expressions. One example where vagueness is desirable involves suppressing the agent of the action in passives, as in (i). In English, passive constructions serve this purpose particularly well, while in other languages, such as Serbian, middles are used for this purpose as well (Section 3.4).

(i) The policeman was wounded.

The point here is that one does not always want or care to express precisely who did what to whom, but just to express that something happened.

process. While it may seem that such combinations of nouns directly reflect our cognitive abilities for headed Merge and recursion, it is worth pointing out that not all languages in fact use such compounds, and especially not recursively (see Section 1.6; Chapter 6; also Snyder 2014).

In contrast, as will be discussed in Chapter 6, VN compounds are typically neither headed (hence the name exocentric) nor recursive. Moreover, they are relevant for the purposes of this book because they are combinations of a verb and a noun, typical building blocks of clauses/sentences, and the first categories to emerge and be differentiated (e.g. Heine and Kuteva 2007). Finally, these VN compounds reveal evidence of ritual insult, rendering them of particular interest for evolutionary considerations for that reason as well. Chapter 6 offers additional reasons for their evolutionary significance.

3.3.3 *Absolutives*

The vagueness attested in exocentric VN compounds is also characteristic of intransitive absolutives in some ergative-absolutive languages. Consider another example from Tongan featuring an intransitive sentence with the absolutive case (Tchekhoff 1973: 283):¹⁸

- (20) Oku ui ‘a Mele
 PRES call ABS Mary
 ‘Mary calls.’
 ‘Mary is called.’

In this intransitive sentence, Mary can be interpreted either as the agent of the action, or the patient/theme. But, as pointed out in Tchekhoff (1973), this sentence means neither “Mary calls” nor “Mary is called” in Tongan, these being just two different translations of one single underdetermined/underspecified structure in Tongan. In other words, these translations reflect our nominative/accusative bias. Instead, all this sentence means is that there is calling, and that Mary is implied in the process (Tchekhoff 1973: 284). This is also the essence of Gil’s analysis of vague sentences in Riau (Footnote 18), as well as my proposal for middles in Serbian, and the idea of a proto-role (Section 3.4.2).

¹⁸ See also Gil (2005) for an extensive discussion of comparable vague clauses in Riau Indonesian:

- (i) Ayam makan
 chicken eat
 ‘The chicken is eating.’
 ‘Somebody is eating the chicken.’
 Etc.

While Gil does not analyze Riau as an ergative-absolutive language, this may be simply because it does not have a special ergative case marking, which would then contrast with an absolutive case. But, for all relevant purposes, the structure in (i) above can be considered absolutive-like, as it exhibits the same properties found in intransitive constructions in ergative-absolutive languages such as Tongan.

In ergative-absolutive patterns, the subject of an intransitive predicate is morpho-syntactically equivalent to the object, both characterized as absolutive arguments (e.g. Comrie 1978; Dixon 1994). Only agents of transitive verbs are marked distinctly, with ergative case.¹⁹ It is only after the addition of the external ergative argument (e.g. *John* below) that the role of *Mary* disambiguates and is necessarily patient/theme (Tchekhoff 1973: 283). In other words, the addition of the external argument forces the inner absolutive layer to distinguish itself from the external argument, resulting in more precision.²⁰

- (21) Oku ui 'e Sione 'a Mele
 PRES call ERG John ABS Mary
 'John calls Mary.'

The examples in (20–21) illustrate quite clearly how the ergative argument (*John*) is inserted into the basic absolutive layer. They also illustrate something that has been noted repeatedly in the typological literature, that the ergative-absolutive structures resemble passive structures in nominative-accusative languages, in which the agent is introduced as an oblique argument, e.g. as a *by*-phrase in English passives, as discussed further below (see e.g. Hale 1970). These similarities extend to the nominal domain as well, as discussed in the following section.

Dyirbal (Australian language spoken in northeast Queensland) is another ergative language which, like Tongan (see also Dukes 1998), exhibits syntactic ergativity, in the sense that the absolutive role even in transitive constructions continues to behave in a subject-like fashion, as illustrated with a coordinated structure below (Dixon 1994: 155):

- (22) nguma yabu-nggu buran banagan^yu
 father.ABS mother-ERG saw return
 'Mother saw father and (father) returned.'

This clearly contrasts with English (23) below, in which a comparable coordinated structure yields the opposite result for the missing argument:

- (23) Mother saw father and (mother) returned home.

In fact, if we were to coordinate a passive sentence and an active sentence in English, we would get the pattern comparable to the one in (22) from Dyirbal:

- (24) Father was seen by mother, and (father) returned home.

¹⁹ To put it slightly differently, as is often done in the literature on ergativity, the ergative alignment involves formal singling out of the agent of transitive verbs in contrast to the patient of transitive verbs and the single argument of intransitive verbs (e.g. Authier and Haude 2012; see also Comrie 1978; Dixon 1994).

²⁰ Notice that the addition of *-er* in VN compounds has a comparable effect, as pointed out above.

This is the sense in which the ergative phrase can be likened to the passive *by*-phrase. The *by*-phrase here, just like the ergative phrase in (22), is not the true, structural subject, but only the “logical” subject, as will also be discussed with respect to the noun phrases in Section 3.3.4.1. This is also the reason behind the proposals in Nash (1996) and Alexiadou (2001) that ergative phrases may be attached by adjunction, in a way similar to the attachment of the passive *by*-phrase in English.

While Tongan and Dyrbal are analyzed as syntactically ergative languages, in the sense that they exhibit both morphological and syntactic ergativity, there are many ergative languages spoken today which exhibit only morphological ergativity, patterning with English with respect to e.g. coordination (see Aldridge 2008 for an overview and discussion; thanks also to Robert Henderson, p.c. 2013, for a discussion on this). Likewise, ergative-absolutive languages typically show the so-called split-ergativity, in the sense that they are ergative with some nouns/pronouns, but accusative with other nouns/pronouns, as discussed in Section 7.3.3. Tongan has also developed certain morphological constructions that can be analyzed as accusative patterns (see e.g. Tchekhoff 1973). It may well be that every language has some ergative and some accusative patterns, and it is only a matter of which patterns prevail.

Assuming that there was an intransitive absolutive-like (proto-syntactic) stage in the evolution of human language, one can envision the subsequent development of the two basic language types, primarily nominative-accusative and primarily ergative-absolutive. Lehman (1985: 245) points to the gradient nature of the distinction between the ergative and accusative types: “a language is never wholly and exclusively either ergative or active or accusative, in all its grammatical patterns.” As pointed out in this section and in the following sections, there are many absolutive-like constructions in nominative-accusative languages. Likewise, so-called ergative languages often develop nominative-accusative patterns in some domains, e.g. in the domain of personal pronouns (which are higher on the animacy hierarchy), resulting in so-called split ergativity (e.g. Trask 1979 and references there; see Chapter 7 for more discussion). This overlap is what one would expect under the evolutionary approach explored here.

Bringing unaccusativity and ergativity under the same umbrella, Bok-Bennema (1991: 169) points out that ergativity and unaccusativity are both characterized by the inability of transitive verbs to assign structural case to their deep objects. To put it another way, neither ergative nor unaccusative structures can have true (syntactic) objects, that is, objects distinguished from subjects by means of a specific structural case (see Footnote 16). According to e.g. Alexiadou (2001: 18; also Hale 1970; Nash 1995), ergative-absolutive patterns are reflexes of a passive/unaccusative system. Therefore, what all these phenomena have in common (absolutives, exocentric VN compounds, unaccusatives, and passives) is that the verb is unable to assign structural case to its deep object. Given that the object does not receive a distinct (accusative) marking, the distinction between subjecthood and objecthood is blurred.

These phenomena begin to make sense if they are seen as survivors from a two-word proto-syntax stage, which could only accommodate one argument per verb, and which did not have the means to distinguish between subjects and objects. As pointed out above, it is perfectly plausible to expect that the absolutive-like patterns will be preserved in some constructions, especially those in which subject/object differentiation is not important. It is also conceivable under this approach that the foundational absolutive-like patterns will be found in some guise or another in nominative-accusative languages as well, as explored further in the following section. Languages may vary considerably with respect to the degree to which they rely on the foundational absolutive-like patterns, but my argument is that every language has at least some constructions which are absolutive-like in nature, providing continuity and common ground between the two language types.

3.3.4 *More absolutive-like patterns in nominative/accusative languages*

As noted in e.g. Authier and Haude (2012: 2) “some notoriously ‘accusative’ languages such as Latin, French, and in fact many Indo-European languages may have some hints of ergativity” (see also Bauman 1979: 430; Lehman 1985). Such hints of ergativity have already been introduced in this chapter for English and Serbian exocentric compounds, as well as for unaccusatives. This section considers additional constructions that can be seen in a similar light, including nominals (Section 3.3.4.1), dative subjects (Section 3.3.4.2), and clausal complements (Section 3.3.4.3).

3.3.4.1 *Nominals* This section is there to show that even in English one finds, in productive use, these absolutive-like structures which do not distinguish subjects from objects, resulting in vagueness. According to e.g. Alexiadou (2001), nominals across various languages are intransitive, as well as absolutive-like (passive-like). In other words, all nominals, whether passive or not, have an intransitive base (see also Picallo 1991; Bottari 1992; Alexiadou and Stavrou 1998). In passive nominals the agent appears as an adjunct, as in (25) from Alexiadou (2001: 78).²¹

(25) the destruction of the city by the barbarians

In this analysis, *by*-phrases in derived nominals can only be interpreted as affectors (agents, instruments, creators), rendering examples such as (26) not fully grammatical.²²

²¹ Comrie (1978) suggests that nominalizations constitute a possible source for ergativity. Or perhaps it is the other way around.

²² One reviewer does not find (26) completely ungrammatical. A native speaker I consulted likewise finds this example marginal/awkward, but not fully ungrammatical. On the other hand, (25) is fully grammatical, indicating that there exists some contrast here, although perhaps subtler than perceived in Alexiadou (2001). Interestingly, a similar contrast is offered in Pesetsky and Block (1990: 751) in order to challenge Pinker and Bloom (1990), as discussed in Section 7.4:

- (i) the city's destruction by the enemy
- (ii) ?*the city's sight by the enemy

According to the authors, unlike with the verbal domain, there is no structural external argument in nominalizations, generated in a vP (or an nP, the nominal equivalent of a vP), and the presence of the *by*-phrase seems to be lexically licensed. In that sense, the external argument in the *by*-phrase resembles ergative case, which is also often analyzed as lexical/prepositional case, rather than structural case (see above).²³

(26) ??the receipt of the package by John

This is consistent with the proposal in this chapter that the intransitive, absolutive-like/passive-like patterns provided a foundation for evolving transitive structures, with ergativity and accusativity being different solutions to the same problem of accommodating an additional, external argument.

3.3.4.2 *Dative subjects* Consider next dative “subjects” in Serbian, which co-occur with nominative “objects” in what certainly looks like an ergative/absolutive pattern:

(27) Meni se piije kafa.
 me-DAT SE drinks coffee-NOM
 ‘I feel like drinking coffee.’

Nominative on the “object” is like absolutive, being also the case of intransitive subjects, while dative adds an external argument, akin to an ergative (see e.g. Alexiadou 2001; Nash 1996, for an adjunction analysis of the ergative argument). As pointed out in e.g. Trask (1979: 398), the ergative case is often identical to the genitive, dative, or locative. According to Nash (1996: 171), ergative subjects, like dative subjects, cannot co-occur with structural accusative, but instead appear with absolutive/nominative “objects.” This is yet another construction in which the verb fails to assign structural (accusative case) to what would be its object.

It is also of significance here that dative subjects in Serbian typically co-occur with the (middle) pronoun *se*. As per the proposal in Section 3.4.2, *se* is associated with the ancient absolutive-like pattern.

3.3.4.3 *Clausal complements* The clausal complements of the so-called raising predicates, such as *seem*, *appear*, *likely*, as well as of predicates such as *obvious*, are also absolutive-like/unaccusative-like in nature. While they are generated as

²³ For additional references claiming that ergative is an inherent case, see e.g. Woolford (1997, 2006); Legate (2008); Massam (2000, 2001). There are alternative analyses of ergative arguments. For example, Otsuka (2011) treats ergative as structural, rather than inherent case, based on the analysis proposed by Levin and Massam (1985), and further developed by Bobaljik (1993) and Laka (1993). According to that analysis, both ergative and absolutive are structural cases, and the difference between accusative and ergative languages is taken to be the choice of primary case between the two core structural cases, one assigned by T and the other assigned by v. These references also suggest that the absolutive case is licensed by v, which would not work with my analysis, according to which vP is not projected in intransitive absolutive constructions.

complements of the verb, they do not receive accusative case, and there is no external argument either, which is reminiscent of the unaccusative grammars.

(28) It seems/appears/is likely that John is in jail.

(29) It is obvious/surprising that John is in jail.

For purely grammatical purposes, the subject position of these sentences hosts an expletive (meaningless) pronoun *it*, but this pronoun is certainly not an argument of the verb. In fact, what looks like an external argument can optionally be added, as in:

(30) It seems to me that John is in jail.

(31) It is obvious to me that John is in jail.

Intriguingly, when it comes to comparable predicates in Serbian, their external argument, if expressed, would appear as a dative subject:

(32) Čini mi se da je Jovan u zatvoru.
seems me.DAT SE that is John in jail

Both Serbian *mi* and English *to me* can be seen as a type of ergative case, added to the otherwise absolutive foundation. This just shows that various quirky and exotic-looking phenomena across languages can be understood in this evolutionary framework.

3.4 Precursors to transitivity

3.4.1 Serial verb constructions

As a reviewer rightly points out, also of relevance to this discussion are the so-called serial verb constructions, widespread in Creole languages, in the languages of West Africa, Southeast Asia, Amazonia, Oceania, and New Guinea. Serial verb constructions can be characterized as sequences of verbs “which act together as a single predicate, without any overt marker of coordination, subordination, or syntactic dependency of any other sort,” describing what is conceptualized to be a single event (e.g. Aikhenvald 2005: 1). What one observes in these examples again is that there is one argument per verb, and the relationship of that argument to the verb seems absolutive-like. According to Givón (1979: 220), serial verb constructions involve “a concatenation of small propositions in which, roughly, a one-to-one correlation is maintained between verbs and nominal arguments.”

Aikhenvald further states that these constructions are monoclausal, and that their intonational properties are the same as those of a monoverbal clause, sharing just one tense, aspect, and polarity value. Importantly, she also mentions that serial verbs do not necessarily have to be next to each other, as they are in (34), but can also be separated by other constituents, as in (33).

Anyi-Sanvi (Kwa family, Niger-Congo: Van Leynseele 1975: 191–2)

- (33) cùá òi ákó 'dì
 dog catch._{HAB} chicken eat
 'The dog eats (lit. catch-eat) a chicken'

Igbo (Igboid, Benue-Congo, Niger-Congo; Lord 1975: 27)

- (34) ó tí-wà-rà ètèrè á
 he hit-split.open^{-TENSE} plate the
 'He shattered the plate.'

It is of note here that (33) in essence has an N V—N V structure, comparable to the structures attested in Nicaraguan Sign Language (e.g. WOMAN PUSH – MAN FALL) (see e.g. Section 1.6). Intriguingly, Senghas *et al.* (1997: 558) claim that the N V – N V structures of the first generation of NSL signers tend to become N VV N (WOMAN PUSH FALL MAN), or N N VV (WOMAN MAN PUSH FALL) combinations, with the second generation. In other words, the second generation is grouping the two verbs so that they are adjacent to each other, as is typically the case with serial verb constructions. As Senghas *et al.* (560) conclude in the article, the next stage may be a stage where transitivity emerges, with only one verb remaining to support both nouns. This is essentially the path of grammaticalization envisioned in e.g. Givón (1979: 220).

While I would like to leave a more detailed investigation of serial verb constructions from this perspective for future research, it is worth pointing out that developing an intricate system of such constructions may have been yet another route toward transitivity, by embracing the dual-verb structures. If so, it is significant that the intransitive foundation (one absolutive-like argument per verb) provides the common ground for such a wide range of strategies for expressing transitivity.²⁴ In fact, this astonishing variety of strategies for expressing transitivity across languages and constructions seems to have nothing in common except for this paratactic, absolutive-like foundation. If true, this provides significant support for the reconstruction explored in this chapter, and for the gradualist approach to the evolution of syntax more generally.

3.4.2 *The “middle” ground*

According to e.g. Kemmer (1994: 181), “the reflexive and the middle can be situated as semantic categories intermediate in transitivity between one-participant and

²⁴ If this is the origin of at least some serial verb constructions, then at least they should not be analyzed on a par with compounds, or as some kind of freely Merged V-V combinations (as per the discussion in Section 1.6). Instead, they should be seen as a by-product of, or as one kind of solution to, the emergence of transitivity from paratactic combinations of intransitive small clauses.

two-participant events.”²⁵ Here I consider just one representative example: *se* constructions in Serbian that can be characterized as middles as they straddle the boundary between the passive and active voice. In addition to dative subject clauses introduced in the previous sections (3.3.4.2 and 3.3.4.3), *se* is also used in a wide variety of other constructions in Serbian, and may well be one of the most frequently used words in the language.

Where pragmatics allows, *se* constructions in Serbian exhibit astounding vagueness of meaning, and *se* clearly cannot be analyzed as a reflexive pronoun, reflexivity being only one of the available interpretations, and not even a preferred one, as the following examples illustrate:

- (35) Deca *se* tuku.
 children SE hit
 ‘The children are hitting each other/?themselves.’
 ‘The children are hitting somebody else.’
 ‘One hits/spanks children.’

- (36) Pas *se* ujeda.
 dog SE bites
 ‘The dog bites (someone).’
 ‘?The dog is biting itself.’
 ‘?One bites dogs.’

- (37) Marko *se* udara loptom!
 Marko SE hits ball-INST
 ‘Marko is hitting **me** with a ball.’
 ‘Marko is hitting somebody with a ball.’
 ‘?Marko is hitting himself with a ball.’
 ‘?One is supposed to hit Marko with a ball.’

If (37) is uttered with a sense of urgency, the most probable interpretation will involve the most salient discourse participant, the speaker, even though there is no word or morpheme corresponding to the first person at all! Even though (38) below offers an unambiguous way of expressing the first reading of (37), (38) is much less likely to be used in the heat of the moment, suggesting that *se* constructions are easier to process than regular transitives:

- (38) Marko *me* udara loptom!
 Marko *me* hits ball-INST

²⁵ Kemmer (1994: 184) points out that middle systems are quite widespread, being found in a large number of genetically and areally divergent languages. According to Arce-Arenales, Axelrod, and Fox (1994: 2–3), the “middle diathesis” is marked in all nom-acc languages, and many constructions which have traditionally been analyzed in terms of passive voice could be better understood as middle diathesis.

It is significant that the vagueness in *se* clauses illustrated above is comparable to that found with Tongan absolutes (20) and Riau intransitives (Footnote 18), as well as with exocentric compounds. In (36), as apparent from the translations, Marko can be either the subject (agent), or the object (patient), or both at the same time, the latter option yielding the reflexive interpretation. This kind of ambivalence can only be a result of underspecification, that is, of simple, unarticulated syntax and semantics.²⁶ Given this, the meaning of (37) and (38) can be roughly characterized in the following way:

(37') There is an event of hitting with a ball, and Marko is a participant in that event.

Logical formula: $\exists e [H(e) \wedge \text{Participant}(\text{Marko}, e)]$

(38') There is an event of hitting with a ball, and Marko is the agent of that event, and the speaker is the patient of that event.

Logical formula: $\exists e [H(e) \wedge \text{Agent}(\text{Marko}, e) \wedge \text{Patient}(\text{Me}, e)]$

It is probably more accurate to characterize (38') as (38'') below, building directly on the middle pattern in (37'):

(38'') There is an event of hitting with a ball, and Marko is the agent of that event, and the speaker is the participant of that event.

Logical formula: $\exists e [H(e) \wedge \text{Agent}(\text{Marko}, e) \wedge \text{Participant}(\text{Me}, e)]$

This would essentially mean, as discussed in this chapter, that the basic absolute layer is still preserved even in (38), and that it is by virtue of superimposing a higher argument that the initial participant is now interpreted as a non-agent, in this case as patient/theme. This is exactly what we see with the Dyrbal data in Section 3.3.3.

Interestingly, Dowty (1991) also questions the rigidity and discreteness of theta roles, and proposes that they can instead be seen as prototypes, or proto-roles, such as proto-agent and proto-theme roles (thanks to a reviewer for leading me in this direction). The participant role that I am using here can then be seen as an even more underspecified role, just a proto-role. This is then how one can characterize proto-predication – as involving a verb (predicate) and just one argument, with a proto-role of a participant.

The presence of *se* simply implies that there is one more participant involved in the event, in addition to the one surfacing, and typically its role can be inferred from pragmatic context (e.g. 37). But the role of the expressed argument (e.g. *Deca*, *Pas*, or *Marko* above) still remains absolute-like, not grammatically specified as either subject or object, giving rise to massive ambiguities (Progovac 2005a, 2013b, 2014a,b).

²⁶ Recall that VN compounds, which are also analyzed as absolute-like, are likewise vague in this respect, with the noun acting either as an object, or as a subject, or as both at the same time in some cases.

The constructions in (35–36) once again illustrate a two-word grammar at work (this time enhanced by the particle *se*). Even though, pragmatically speaking, one is dealing here with an event with two participants, this kind of fossil syntax cannot express both arguments, nor can it specify whether the only expressed argument is subject or object.²⁷

Comparable vagueness may also be found with cognate *se* constructions in other Slavic languages, but also in Spanish (Arce-Arenales, Axelrod, and Fox 1994: 5), clearly indicating that the phenomenon illustrated above is not just a quirk of Serbian.²⁸

- (39) Juan *se* *mató*.
 Juan _{SE} killed
 ‘Juan got killed.’
 ‘Juan killed himself.’

Serbian *se* is analyzed in Franks (1995) and Progovac (2005a) as an expletive (meaningless) pronoun, “absorbing” accusative case. Another way to look at it is to say that *se* in these constructions is a proto-transitive/proto-accusative marker imposed upon an ancient absolutive pattern, but being stuck in this intermediate stage between absolutivity and transitivity. As pointed out by Maggie Tallerman (p.c. 2014), these *se* constructions, as well as other constructions which I consider “transitional” in this framework, are not transitional in the sense that they are unstable or in the process of changing – they can only be transitional in the sense that they straddle the boundary between transitivity and intransitivity.

It is hard to be sure how to analyze these *se* constructions by using the tools of Minimalism, and the derivation in (40) is just a suggestion:

- (40) [_{TP} Deca [_{FP} *se* [_{SC/VP} ~~deca~~ *tuku*]]]
 children _{SE} ~~children~~ hit

Again, the idea is that the noun and the verb are first Merged in a SC/VP (Section 1.7). Next, a proto-transitive functional word *se* is Merged with the SC/VP to create some

²⁷ It is interesting to note in this respect that Otsuka (2011) analyzes some of the Tongan constructions as involving a null SE anaphor, even though, as he mentions, Tongan does not have any overt anaphors! The way I see it, the author is simply noticing a connection between absolutivity and *se* middles.

²⁸ Consider also the vagueness of the English example below:

- (i) The children got dressed.

As argued in e.g. Alexiadou (2012), these *get*-passive constructions should be analyzed as middles, that is, constructions which have only one structural argument. In this respect, *get*-passives are non-canonical passives, given that canonical passives are taken to have two structural arguments. Middles in English also include examples such as (ii–iii), among others:

- (ii) These apples sell well.
 (iii) The glass cuts easily.

kind of functional projection, whose head is *se*, and which can be labeled as FP.²⁹ Finally, assume that the TP is created, and the noun *deca* Moves to the specifier of the TP. FP is still not a vP, as it does not introduce an agent, nor does it disambiguate the role of the absolutive-type argument in the SC/VP, but it can be considered as a precursor to vP. The next step(s) in developing vP-type transitivity in accusative languages would be to associate this FP with an additional, external argument, such as agent, and to associate the internal argument with the special (accusative) case.

Interestingly, without *se*, the absolutive pattern vanishes, and the only argument has to be interpreted as subject/agent performing an action on an unspecified object, as is also the case with English translations in (41) and (42), a familiar consequence of accusative grammars:

(41) *Deca tuku.*
'The children are hitting (somebody).'

(42) *Pas ujeda.*
'The dog bites (someone).'

This suggests that the fossil absolutive-like structures in Serbian are only preserved under the wing of *se* (as further explored in Progovac 2014b).

It seems, then, that the distinctions between subjecthood and objecthood, transitivity and intransitivity, passive and active, can be neutralized, and can have a middle ground. One way to make sense out of this is to postulate an intransitive absolutive-like stage in the evolution of human language, a stage which provides a foundation for any subsequent elaboration of argument structure.

Importantly, however, introducing transitivity with a structural accusative case (vP/VP shell) to a language does not preclude some other constructions (e.g. unaccusative small clauses, nominals, *se* constructions, compounds) from remaining absolutive-like. What is also important to emphasize is that many of these foundational structures still live inside/within the more complex structures. For example, absolutives generated in small clauses/VPs arguably live inside nominals, *se* constructions, and transitives, and small clauses in general live inside TPs, as commonly assumed in syntactic theory (Chapter 2). This reinforces the claim in this monograph that small clauses and intransitive absolutives constitute the foundation, the platform on top of which one can build (or not) more complex syntax, namely TPs and transitivity, perhaps in the form of vP shells.

Transitivity in syntax thus need not be seen as conceptual necessity, but rather as an evolutionary innovation; it can be seen as an additional layer of structure superimposed upon the foundational (absolutive) layer, leading to a variety of crosslinguistic strategies

²⁹ *Se* could have even started out as some kind of linker in the sense of Chapter 4.

for marking case relations, and reflected in the postulation of two verbal layers in Minimalism (two vP shells). This renders syntax a quirky system, a product of tinkering, rather than a system optimally designed from scratch. As was the case with the small clause/TP distinction discussed in Chapter 2, the hypotheses explored in this chapter are testable/falsifiable, as well as corroborated by evidence from other fields, as discussed in the following section.

3.5 Corroborating evidence and testing grounds

The strongest corroborating evidence for the proposal in this chapter comes from language acquisition, both involving sign languages and spoken languages. Neuro-imaging would, once again, provide a good testing ground for the hypotheses proposed in this chapter.

As pointed out in Section 3.1, the emergence of NSL provides excellent corroboration for the proposal. According to Kegl, Senghas, and Coppola (1999: 216–17), the earliest stages of NSL, observed with the first generation of speakers, do not exhibit transitive N V N constructions, such as (43) below, at least not when two animate nouns are involved (Senghas *et al.* 1997). Instead, one finds what look like sequences of two clauses of the kind (N V—N V) (44–45):

(43) *WOMAN PUSH MAN.

(44) WOMAN PUSH—MAN REACT.

(45) WOMAN PUSH—MAN FALL.

Aronoff *et al.* (2008, and references there) found a similar pattern for another sign language that emerged spontaneously about 70 years ago, Al-Sayyid Bedouin Sign Language (ABSL). They also report that there is a tendency toward one argument per predicate, where e.g. transitive events involving two animate referents are rendered by two or even three clauses.

These sequences can be analyzed as paratactic/symmetric combinations of two intransitive (small) clauses, which are interpreted as the first one causing the second.³⁰ In this sense, this grammar is absolutive-like, and resembles the grammar behind serial verb constructions and other absolutive-like constructions discussed in this chapter, in that only intransitive structures are available, that is, each verb can have only one argument.

³⁰ This is not necessarily how the authors of the article would analyse these data. My personal communication with Ann Senghas and Marie Coppola (p.c. 2014) revealed that they are revisiting those early analyses, and that there are complexities involved. But, as far as I understand, the claim still stands that in the earliest stages of NSL one finds these N V – N V types of constructions, in lieu of N V N transitive constructions, when both Ns are animate. When one of the nouns is inanimate, then apparently transitive structures are possible.

It is perhaps of interest to mention here that the overwhelming majority of the world languages are classified as either Subject-Verb-Object (SVO) or Subject-Object-Verb (SOV). Both types can be derived easily from a binary N V – N V pattern, comparable to the paratactic patterns in (44–45). If one starts with an N V – N V sequence, and assigns the role of S (subject) to the first noun, and the role of O (object) to the second noun, one can easily derive the two word orders above by dropping one of the verbs (the dropped verb could then be grammaticalized as a null light verb (*v*), as per the syntactic theory). There is another symmetric paratactic possibility: V N – V N, the verb initial order being attested in e.g. unaccusatives and VN compounds. If, again, the first noun is associated with S, and the second noun with O (as per the Cause First principle discussed in e.g. Section 1.6), this underlying pattern can easily yield the SVO order again, but also another possible word order across languages, VSO. The other logically possible word orders are extremely rare across languages. Needless to say, this is a rather speculative observation.

According to Goldin-Meadow (2005), the syntax of Homesign languages, self-styled gestural communication systems spontaneously developed by deaf children not exposed to sign language, also appears to be absolutive-like. In Homesign, both patients/themes and intransitive agents tend to precede verbs, once again neutralizing the distinction between subjects and objects. Also, patients are more likely to be expressed than agents, as is also the case with exocentric compounds and nominals discussed in the previous sections. As Goldin-Meadow notes, both American and Chinese deaf children are more likely to produce the sign for the eaten than for the eater. In Zheng and Goldin-Meadow's (2002: 171–2) study, the Chinese children showed a bias to omit only the subjects of caused motions (agents), not the subjects of spontaneous motions. Subjects of spontaneous motions were produced as often as objects.

Considering that early stages of NSL, ABSL, and Homesign are languages arguably constructed from scratch, the patterns of intransitivity and ergativity observed in their creation are of evolutionary significance (see Section 2.5.1 for much more discussion regarding the reasons why language acquisition can be relevant for language evolution studies). At the very least, these considerations demonstrate that there is a simpler way to break into syntax, starting with intransitive clauses and blurring the distinction between subjecthood and objecthood.

Moreover, children acquiring spoken languages also go through a two-word stage (Bloom 1970) which seems to be characterized by similar proto-syntactic patterns. It is often claimed for child language acquisition that children “delete” arguments in their speech, that is, that they do not express all the arguments that would typically be required in the adult grammar.³¹ According to Zheng and Goldin-Meadow (2002:

³¹ As pointed out in Section 1.6, Bickerton (1990, 1998) takes this frequent omission of arguments to indicate that children at this stage do not have “real” language.

171–2), such “deletions” are not random, but rather follow an ergative pattern. If children in these cases are using absolutive-type intransitive grammars, as per the proposal in this chapter, then they are not deleting anything, but rather just using the syntactic mold in which there is room for expressing only one single argument.

Similar patterns in language acquisition of spoken languages have been reported by other authors. For example, when hearing children are exposed to Korean (Clancy 1993) or Samoan (Ochs 1982), they too follow the deaf children’s pattern—they omit transitive subjects and produce intransitive subjects and objects, exhibiting essentially an absolutive pattern. Indeed, the same pattern has been observed for English language acquisition (Goldin-Meadow and Mylander 1983: 63). As Zheng and Goldin-Meadow (2002: 171–2) conclude, the ergative pattern is more robust, considering that the omission pattern found in all of these hearing children and the deaf children is reminiscent of the alignment found in ergative languages. This ties in well with the approach explored in this chapter.

As pointed out by a reviewer, the preferred discourse pattern in a variety of languages is the pattern in which only one argument is given in full, while the other arguments are either omitted altogether or occur in a reduced (affix) form (see e.g. Newmeyer 2005: 132–3, and references there). For example, Du Bois (1985: 347–9) found that in Sacapultec, a Mayan language of Guatemala, most clauses in the discourse contain only one full noun phrase, with zero noun phrases also very common. The full NP that commonly occurs is the absolutive, consistently following the verb, while the ergative full noun phrases are infrequent.

In addition, Du Bois (1987) has noted that the pattern in which the grown is expressed more readily than the grower is common in the adult languages of the world, as attested with the intransitive constructions in (b) from English:

(46) a. John grew tomatoes. b. John grew.

(47) a. John shook Bill. b. John shook.

While the transitive pattern in (a) necessarily takes John to be an agent, the intransitive counterparts in (b) favor the interpretation in which John is undergoing the action, as a theme/patient. In other words, there is avoidance of agents/external arguments in these cases (see also Casielles and Progovac (2010, 2012) for the significance of this phenomenon for language evolution, and in particular for the Agent-First hypothesis).

Interestingly, the bonobo Kanzi has been reported to have mastered a VS (two-word) syntax in his use of lexigrams and gestures, based on the description in Greenfield and Savage-Rumbaugh (1990: 161), as well as Heine and Kuteva (2007: 145–7). First of all, Kanzi only uses two-word combinations, including creations with one verb and just one argument, in a way that does not distinguish agents/subjects from patients/objects, with both following the verb. While Kanzi’s initial combinations

(during the first month) show free word order (*hide peanut, peanut hide*), the later combinations seem to converge on the productive VS order, even when the noun is the agent, in the sense that the verb is followed by an agent gesture.³²

There is a lot of controversy surrounding the interpretation of these and other reports on primate communication, and it is not my intention to engage with these controversies in this book. For now, suffice it to say that, if Kanzi is in principle capable of (sporadic) two-word (intransitive) combinations, then it is conceivable that at least some individuals of our common ancestor with bonobos were too. This would have been enough to allow the process of natural selection for language.

Last but not least, as pointed out in Chapter 2, neuroimaging can provide a fertile testing ground for the hypotheses explored in this chapter. The suggestion is that one can use the subtraction and other neuro-linguistic methods to determine how proto-syntactic structures are processed in comparison to their more complex counterparts, in the hope of finding neuro-biological correlates of, for example, vP shells and transitivity (see Progovac 2010b).

For the reasons given in the Appendix, while the processing of transitives with vP shells is expected to show clear lateralization in the left hemisphere, with extensive activation of specific Broca's areas, the proto-syntactic structures, such as absolutive-type constructions, as well as middle *se* constructions, are expected to show less lateralization, and less involvement of Broca's area, but more reliance on both hemispheres, as well as, possibly, more reliance on the subcortical structures of the brain. To take just one concrete example (not discussed in the Appendix), it follows from the analysis presented in this chapter that *se* constructions (and middles in general) are easier to process than regular transitives, given that they involve simpler, less articulated syntax. This can be tested given the availability of minimally contrasting pairs in Serbian involving *se* constructions (48) vs. true transitive counterparts (49), as suggested in Progovac (2014a,b):

(48) Marko *se* udara!
Marko _{SE} hits

(49) Marko *me* udara!
Marko *me* hits

If syntax evolved gradually, through several stages, then it is plausible to expect that modern syntactic structures and operations decompose into evolutionary

³² As pointed out by e.g. Tallerman (2012: 453), human syntax is far more than regularities in word order, concluding that "at most we can agree that Kanzi has learned a productive proto-grammar." Tallerman (2012: 454) further elaborates that "certain properties that we might call proto-syntactic are attested in animal language research. Words can be meaningfully combined, especially in novel ways..." This is where the reconstruction of syntax in this book should be helpful. It decomposes syntax all the way down to the simplest syntactic strategy, which in turn allows one to find some continuity, however tenuous it may be, with animal communication systems.

primitives. If so, this will not only be measurable in the activation of the brain, but without these evolutionary considerations it may not be possible to achieve a true breakthrough in the field of neuro-linguistics (see Section 2.5.3).

3.6 Conclusion

This chapter builds on the arguments of Chapter 2, and reconstructs a stage in the evolution of human language which is characterized by intransitive small clauses, lacking vP and TP structure, and allowing only one proto-argument per clause, that is, an argument whose thematic role is underspecified. This stage is arrived at by internal reconstruction based on the syntactic hierarchy of functional projections. Peeling off the outer clausal layers, TP and then vP, one arrives at the basic predication structure of an intransitive small clause. As with the proposal in Chapter 2, there are three prongs to this argument. First, the absolutive-like pattern is shown to provide a foundation upon which transitive structures are built. Second, there is a variety of absolutive-like foundational structures even in nominative-accusative languages. And, third, there is good corroborating evidence and promising testing grounds for this proposal. Furthermore, postulating an intransitive absolutive-like stage allows one to clearly identify the kinds of evolutionary pressures that would have led to the rise of transitivity, as explored in Chapter 7.

Parataxis and coordination as precursors to hierarchy: Evolving recursive grammars

4.1 Hypothesized evolutionary stages of syntax

The goal of this chapter is to show that syntax can be decomposed into evolutionary primitives/layers at an even more abstract level than explored in the previous chapters, and that such decomposition can not only help identify the stages of evolutionary progression of syntax, but also shed light on its very design. The intent is also to show that the progression through such stages makes evolutionary sense, i.e., that each new stage brings some concrete advantage(s) over the previous stage(s), and that such advantage(s) could have been subject to natural selection.

Considering some present-day constructions, as well as the trends in grammaticalization processes, I propose the following three *rough* stages in the evolution of syntax (i–iii), following a hypothetical non-syntactic one-word stage (o). My working assumption, the simplest possible, and the least stipulative, is that any combination of words/phrases into a single utterance involves syntax.

(o) *One-word stage* (no combinatorial power)¹

It has been postulated that children go through a one-word stage as they acquire language (e.g. Bloom 1970), but adult speech also sometimes involves single words meant as complete utterances (as in e.g. *Snake! Run! Out!*) Since the one-word stage does not involve syntax, it will not be discussed here, except to show why it would be beneficial to advance from this stage to a proto-syntactic stage, as characterized in (i) below.

(i) *Paratactic stage (proto-syntax)*, where prosody/supra-segmentals provide the only glue for (proto-)Merge. In other words, in this stage there is prosodic evidence, but not any segmental evidence, that the words/constituents are Merged. The paratactic

¹ See Section 4.2.2 for some discussion regarding the issue of valence in a one-word stage.

syntax of this stage can be characterized by an operation Conjoin, rather than Merge proper. As explained below, Conjoin is an operation not distinct from Adjoin, as used in e.g. Adger (2003) for the attachment of adjuncts. Unlike Merge proper, Conjoin does not create headedness or hierarchy.

(ii) *Proto-coordination stage*, where, in addition to prosody, the conjunction/linker provides all-purpose *segmental* glue to hold the utterance together. In this stage, the evidence for (proto-)Merge is more robust, as it retains the prosodic evidence (the only type of evidence available in the previous stage), and adds to it segmental evidence (the linker), even though in this stage the linker does not add much more than that to the interpretation. This stage is arguably still syntactically flat/non-hierarchical.

(iii) *Specific functional category stage (hierarchical/subordination stage)*, where, in addition to prosody and to segmental glue, specific functional categories emerge, providing specialized syntactic glue for constituent cohesion, including tense particles (copulas) and subordinators/complementizers. In other words, this stage includes all the achievements of the previous stages, and adds another, which is to use the segmental piece (linker) also to identify the type of constituent created by Merge. To take just one example, a meaningless linker of the proto-coordination stage, connecting the subject and its predicate, becomes a meaningful tense particle, which can now build its own Tense Phrase (TP). I argue that it is only at this stage that hierarchical structure, Move, and recursion become available, considering that adjunction and coordination structures, characterizing the previous two stages, are typically islands for Move (Chapter 5), and do not show true recursion.²

This is a progression from least *syntactically* elaborated (parataxis), to more elaborated (coordination), to most elaborated (specialized functional categories/projections). I consider that each of these grammars can operate both clause-internally, e.g. to combine a subject and a predicate (into a small clause *Me first!*), and clause-externally, to combine two such clauses into a single utterance (e.g. *Nothing ventured, nothing gained*).

² I should clarify here that I do not consider Move to be subsumable under Merge, the so-called Internal Merge, as is typically assumed in the Minimalist Program today. Instead, the considerations in this book lead me to conclude that Merge is just a necessary condition for realizing Move, but that Move requires additional conditions to be met, as discussed below, as well as in Section 4.4.5. So does recursion.

As will be discussed in Section 4.3, the coordination stage and the subordination stage may not have shown a clear chronological ordering in the evolution of human language, as they may have been intertwined, just as they seem to be in today's languages. Still, they can be ordered in terms of relative complexity, as per the proposal in this book. I hope that future research will shed brighter light on this issue.

As pointed out in the previous chapters, the argument for each proposed progression through stages has three prongs to it: (i) identifying “living fossils” of each stage in modern languages; (ii) providing evidence of “tinkering” with the language design, so that fossils of one stage can be shown to be integrated into the next, leading also to composite structures incorporating constructions of various stages; (iii) identifying existing or potential corroborating evidence from grammaticalization, language acquisition, agrammatism, animal communication, neuroscience, and genetics. Moreover, the goal is to show that each identified stage accrues concrete and tangible advantages over the previous stage(s), advantages specific enough to be targeted by natural/sexual selection.

One of the themes of this monograph is that the advent of a new stage does not replace the previous stage(s), but rather that the older stages continue to co-exist, often in specialized or marginalized roles, in addition to being built into the very foundation of more complex structures (see Chapters 2 and 3). Evolution is known not to throw a good thing away, but to build upon it, which is why one should expect to find constructions of previous stages (fossils) in the later stages.

Prosody and intonation are of course still in use everywhere not only to signal constituent cohesion, but also to signal grammatical function, such as interrogative mood in (1). When they are used in conjunction with syntactic operations such as Move (subject–auxiliary inversion), the result is redundancy and robustness, hallmarks of evolutionary tinkering.

- (1) Mary is already at home?
- (2) Is Mary already at home?

There is also experimental evidence to show that prosody signals syntactic cohesion. For example, Tyler and Warren (1987) have performed an experiment to see how comprehension is affected by disrupting either syntactic or prosodic structure. Their conclusion is that a disruption in prosody has a serious adverse effect on comprehension, suggesting that prosody even today plays a crucial role in achieving syntactic cohesion. Tyler and Warren conclude that “prosody does not play the poor sister to syntax, with prosodic information only used when there are syntactic options, such as syntactically ambiguous phrases. Rather, prosodic information seems to be an integral part of the comprehension process” (656). This is also consistent with Deacon’s (1997) characterization of the role of prosody, as discussed in Section 4.5.1.3.

The progression of stages proposed above is consistent with what one finds with the grammaticalization processes observed in the present times. The grammaticalization of e.g. finite subordination typically takes parataxis as a starting point and possibly proceeds through a(n intermediate) coordination stage, as discussed in Section 4.5. Here I extend this progression of stages even to clause-internal level, suggesting that predication may have also gone through a similar progression in its

evolutionary trajectory: (i) root small clause (SC) stage (created by parataxis/prosody alone); (ii) proto-coordination stage (with a linking/conjunction-like element connecting the subject and the predicate); and (iii) a specific functional category stage, i.e. a hierarchical stage involving a specific functional category superimposing one layer of structure (e.g. TP) over another (SC).

As will be discussed further below, while the evidence for a paratactic stage is overwhelming, evidence for a coordination stage is not that robust. This may be because the paratactic structures provide the necessary foundation for building both coordination and subordination, while coordination may serve as an intermediate stage only optionally, in some circumstances.

The following subsections explore each of the postulated stages of syntax, as well as point to the possible communicative advantages of each. The following section will consider some of the same data introduced in the previous two chapters to illustrate the paratactic stage, namely intransitive small clauses and compounds, but the focus in this chapter is on the nature of the bond between merged elements, as well as on how that bond changes with the progression to the subsequent two stages, both clause-internally and clause-externally.

4.2 Paratactic proto-syntax stage

4.2.1 Operation Conjoin: Clause-internally and clause-externally

As argued in Chapter 2, as well as in Chapter 3, the following types of small clauses (3–4), clause combinations (5), and compounds (6) are reasonably good approximations of what the operation Conjoin (proto-Merge) could accomplish in the paratactic proto-syntactic stage. Recall that Conjoin can be characterized as an operation which joins/unites two elements into a single utterance, but in so doing it does not create headedness or hierarchy. What holds the bond together is only intonation/prosody (i.e. supra-segmentals).

- (3) Me first! Everybody out! Him apologize?! Me worry?!
- (4) Case closed. Problem solved. Point taken. Mission accomplished.
Crisis averted.
- (5) Nothing ventured, nothing gained. Monkey see, monkey do. Come one, come all.
- (6) pick-pocket, turn-coat, hunch-back, cry-baby, busy-body, rattle-snake

Of note here is also that certain root small clause types, in particular the clauses illustrated in (3), are characterized by exaggerated intonation, possibly compensating for the lack of functional categories or linkers, and thus tapping into the proto-linguistic ability to use prosody/intonation for the purposes of conjoining. Given this,

it is not implausible to suggest that in this stage of proto-syntax prosody may have been exaggerated, or perhaps even musical, in the sense of “prosodic protolanguage” discussed in Fitch (2010: 475, and references there). However, Fitch’s proposal that this kind of prosodic or musical protolanguage preceded words in the evolution of language, and was devoid of propositional meaning, sort of like birdsong, was rightly criticized by Tallerman (2013a). On the approach explored here, if there was such a musical episode in the evolution of language, then it would have been most useful at this (paratactic) juncture, where prosody/melody would have had a very specific compositional function to hold the (proto-)words and utterances together (see also Section 2.4).

Notice that adjunction, used abundantly in present-day languages, is taken to involve a comparable kind of flat/non-hierarchical structure, essentially parataxis. In (7) below, the adverb is traditionally analyzed as adjoining to the verbal projection (but see Cinque 1999 for a specialized functional category approach to the attachment of adverbs). Similarly, the adverbial clause in (8) is traditionally analyzed as adjoining to the main clause. This kind of attachment does not create a new (functional) category or layer, but rather loosely attaches to an already projected layer, expanding it, as shown below.

(7) She [_{VP} [_{VP} worked] feverishly].

(8) [_{TP} After considering all the options, [_{TP} she ventured out.]]

This is what prompted Jackendoff (1999, 2002) to propose that adjunction structures have proto-linguistic flavor, and that they can be seen as evolutionary fossils (Section 1.6).

While it may look as if adjunction is creating an additional layer of structure in (7–8), this is just an artifact of the lack of appropriate notation. The intent of the vP/TP repetition in these examples is to capture the idea that the existing layer is only expanded/stretched, not that a new layer is created. Just like conjuncts, adjuncts seem to be in a different dimension, and have been seen as merging in a different plane (e.g. Chomsky 2001; also Chomsky 2004; Citko 2011). It is for this reason that I do not consider that the structures in (7–8) involve true recursion, in the sense that one syntactic category is embedded/inserted within another, as its integral part. What we have here instead is an adverb phrase loosely adjoining to a vP (7), and a clause loosely adjoining to another clause (8). In the sense of Kinsella (2009), this should be seen as iteration, rather than true recursion, as discussed further in Section 4.4.

It has been repeatedly noted in the syntactic literature that clausal adjuncts such as the one in (8) are *not* fully integrated into syntactic fabric. As put in An (2007), these adjuncts sit in semi-integrated, “non-canonical” syntactic positions (see also Selkirk 1978; Stowell 1981; Nespor and Vogel 1986; Zec and Inkelas 1990 for the prosodic properties of adjuncts). Whatever the analysis, it highlights the exceptional and

In clauses such as *Me first!* (see (3) repeated below), arguably created by Conjoin, it is not clear what counts as the head (center), the pronoun or the adjective, or something else, and that is precisely why these structures are still referred to as small clauses, i.e. as syntactically undefined constituents (see Chapter 2 for competing analyses of embedded small clauses). Similarly, exocentric compounds (6), which are also arguably created by Conjoin, are traditionally considered to be headless—in fact, the lack of headedness in these compounds is so salient that it is responsible for their name, “exocentric,” that is, without a center/head (see Chapter 6 for details of their analysis). Moreover, the paratactic combination of two clauses in (5) is also headless, and is arguably also a product of Conjoin. It is obvious here that the two clauses are on an equal footing structurally, neither one being structurally embedded within the other. In fact, the nature of the link in the correlative constructions more generally can be considered fossil-like in this respect, given that it involves parallel, symmetric attachment, as discussed later in the text.

- (3) *Me first! Everybody out! Him apologize?! Me worry?*
- (5) *Nothing ventured, nothing gained. Monkey see, monkey do.*
Come one, come all.
- (6) *pick-pocket, turn-coat, cry-baby, busy-body, hunch-back, rattle-snake*

In other words, unlike Merge proper, which is considered to create headedness and hierarchy, Conjoin, subsuming Adjoin, can be seen as an operation creating flat, exocentric (non-headed) structures. In this respect, Conjoin can be seen as creating both conjoined constituents of equal status (parataxis/asyndetic coordination) and conjoined constituents of unequal status (adjunction).⁵

Some syntacticians consider that modern Merge can be decomposed into two operations: Concatenate and Label (e.g. Chomsky 1995; Hornstein 2009; but see Citko 2011). Given this idea, Conjoin can be taken to involve just Concatenate, but not Label, while Merge proper can be considered to involve both. This would be in line with the suggestion in Clark (2013) that labeling might be a later evolutionary development. Labeling itself would be responsible for selecting one of the combined elements to be the head/center of the whole composition, creating headedness and asymmetry. For example, in a combination *run marathons*, the verb and the noun

⁵ According to e.g. Haspelmath (2004: 3–4), coordinating constructions can be identified on the basis of their symmetry, and he includes here both paratactic constructions, without a coordinator, and those with a coordinator. He also struggles with a differentiation between coordination in this sense, and subordination, which involves asymmetry, concluding that “there are many constructions showing mixtures of both, and we are only at the beginning of understanding what constraints there might be on such mixtures” (37). As discussed throughout this chapter, the evolutionary approach explored here predicts that there would be such overlap between stages, and that in fact a clear differentiation will never be possible. As noted by a reviewer, these may pose a challenge for the Minimalist Program.

combine (by Concatenate/Conjoin), but then labeling renders the whole combination a verb phrase, with the verb being selected as the head/center of the whole composition. While this may be a promising direction to explore, here I stick with the more traditional terminology in order to avoid the undesirable assumptions associated with Merge in e.g. Hornstein's (2009) view, including its inseparability from Move and recursion.

The choice of the term Conjoin may seem unfortunate at first sight, given that it can be confused with coordination structures, which are also referred to as conjunction structures. Here the term is used in its lay sense of joining together, or uniting. But this term is often used in linguistic literature not only for structures involving conjunctions (e.g. *and*), but also for paratactic structures without any conjunction, especially if these structures are on equal footing, that is, symmetrical. Are these uses of linguistic terms confusing? Yes, but there is a good reason why it is not possible to clearly delineate and differentiate conjunction from adjunction/parataxis. If my proposal is on the right track, then the initial paratactic Conjoin stage, without any coordinating words, gradually integrated into the proto-coordination stage, in which proto-conjunctions or linkers were used, for the sole purpose of solidifying the operation Conjoin, without much difference in meaning. That is why the terms coordination/conjoin/parataxis are often used interchangeably in linguistic literature. The overlap in terminology is the result of the overlap in constructions: there is no clear differentiation among these processes in present-day languages, as discussed further in Section 4.3. This is as expected under the evolutionary approach explored here.

Recall from Chapter 2 that the paratactic small clauses discussed above cannot be manipulated by Move (10), and that they are not subject to embedding/subordination either (11):⁶

- (10) a. *Where everybody?
 b. *To whom him apologize?
 c. *What solved?
 d. *What ventured, nothing gained?
- (11) a. *Him worry [me first].
 b. *Sheila happy [problem solved].

If root small clauses found in present-day languages are indeed approximations of proto-syntactic structures, then this is consistent with my claim that paratactic proto-syntax was rigid, and that it did not have the operation Move, or the ability to embed one clause within another. Arguably, both of these processes are facilitated by specific functional categories, which provide a stronger bond between constituents.

⁶ The reader is referred to Section 2.4 for some discussion of questions such as *Why worry?* and *How come?*

Clearly, given their behavior illustrated above, root small clauses instantiate a distinct, simpler grammar, which cannot be reduced to superficial omissions of functional categories. In any event, this paratactic grammar is exocentric and flat, rather than hierarchical, and it lacks functional categories such as TP and CP, as well as Move and subordination/recursion.

The clauses investigated in this chapter, as well as in the previous chapters, typically consist of two words, a noun-like element and a verb-like element, which I consider to be in a proto-predication relationship.⁷

As pointed out in Chapter 3, it is entirely conceivable that the first syntactic combinations were two-word utterances, that is, that Conjoin could only combine two elements at a time. In fact, all the evidence from present-day grammars points to that conclusion. First of all, the central operation of modern grammars, Merge, is widely considered to be binary, that is, that it can combine only two elements at a time. If Conjoin was a precursor to Merge, then Merge retained this important property of Conjoin. The same assumption holds for the principle Adjoin, which I consider to be just one facet of the paratactic principle Conjoin. In e.g. Minimalism, binary branching (i.e. binary Merge) is considered to be a syntactic universal, operative in all languages. Also, as discussed in Section 2.5.1, children typically proceed from a one-word stage to a two-word stage, before they start combining more than two words into single utterances.

Furthermore, even observationally speaking, the overwhelming majority of conventionalized compounds across languages are binary, consisting of only two free morphemes.⁸ In addition, where clauses are clearly combined paratactically (e.g. 12), the number of clauses that combine is again typically just two. Combining more than two clauses in this way becomes cumbersome to process, as discussed in Chapter 3):

(12) Nothing ventured, nothing gained. Easy come, easy go.

This adds plausibility to the argument that the initial clauses were two-word (intransitive) combinations, and that only two such clauses could combine paratactically into a conjoined union (see also the examples in 15–19 below).⁹

⁷ Hurford (2012) considers that the first two-word utterances were of the topic-comment kind, and that they only later grew into subject-predicate structures (see some discussion in Section 1.6).

⁸ Here, I am not considering recursive compound processes, such as English (i), but rather compounds that are likely to be stored in the speakers' lexicons, and found in the dictionaries, such as (ii).

- (i) policy committee proposal discussion
- (ii) bedroom, toothbrush, heartbeat

Moreover, in cases where the compound process is not recursive, only two words can combine by default, and this is the case with e.g. English and Serbian VN exocentric compounds, as well as Serbian compounds in general, as discussed further in Chapter 6 (see also Section 1.6).

⁹ Additionally, it is worth pointing out that the structure of ideophones, which can also be considered as linguistic fossils, is paratactic and binary, suggesting that this kind of "grammar" might be working across

In sum, what I propose in this chapter is that both clausal combinations in (5) and predicate–argument combinations in (3–4) can be created by the same type of grammar—paratactic grammar, which is characterized by the operation Conjoin. This parallelism between clause-internal and clause-external processes finds further support in the consideration of the proto-coordination stage, which reveals that the same proto-coordinator/linker can sometimes be used to connect both (Section 4.3).

4.2.2 Paratactic grammar vs. separate utterances

As pointed out in Section 4.1, each new stage should accrue some advantages over the previous stage(s) in order to justify its evolutionary usefulness. In this respect, consider (13) as a report from a business trip, with falling intonation rendering these two clauses two separate utterances, not connected by Conjoin:

(13) Nothing ventured . . . Nothing gained.

The interpretation in (13) is that nothing was ventured, and that nothing was gained. Crosslinguistically, falling intonation implies assertion/certainty/completion, while rising intonation signals uncertainty/incompleteness (e.g. Burling 2005, 170 and references there). In contrast, in (14), Conjoin combines the two clauses into a single utterance, using rising intonation as only glue. This invokes an interpretation that assigns a (causal/conditional) connection to the utterance.

(14) Nothing ventured, nothing gained.

In the absence of specific functional glue of the hierarchical stage (e.g. *If nothing is ventured, then nothing is gained*), concatenations such as (14) typically rely on iconicity of word order to express temporal and/or causal relations (see Section 4.2.3). While structurally neither of the clauses in (14) is embedded within the other, pragmatically they are interpreted in such a way that the first clause serves as a condition for the second, “main” clause.

Such parallel, symmetric concatenations occur crosslinguistically, and are typically preserved in formulaic, proverb-like sayings:¹⁰

linguistic modules. What is also of interest when it comes to ideophones is that the prototypical examples among them are often iconic in the sense that they imitate the sounds (*tick-tock*) or the sights (*zig-zag*) in nature.

- (i) tick-tock; zig-zag; flip-flop; willy-nilly (English)
- (ii) tika-taka; cik-cak; trte-mrte (aha, you are scared!); (Serbian)
apa-drapa (unruly, disorderly); kuku-riku (rooster’s call)
- (iii) mí mè (mosquitoes buzzing); (Hmong)
plī -plǒn (empty bottle submerged in water filling up)

The Hmong data are from Ratliff (2013; see also Ratliff 2010). Some languages, such as Korean, Japanese, and Hmong, make a much more extensive use of ideophones than e.g. English or Serbian, and the speakers of these ideophone-rich languages can create such expressives on the spot.

¹⁰ Comparable concatenations are quite prevalent in pidgin languages as well (e.g. *No money, no come*, Winford 2006).

- (15) a. Easy come, easy go.
b. Monkey see, monkey do.
c. Card laid, card played.
d. Come one, come all.
e. Like father, like son.
f. So far, so good.
- (16) a. Na psu rana, na psu i zarasla.
on dog wound on dog and healed
'No big deal!' (Serbian)
- b. Preko preče, naokolo bliže.
across shorter around closer
'Shortcuts are not always best.'
- c. Koliko para, toliko i muzike.
how-much money, that-much and music
'How much you pay, is how much you can enjoy.'
- d. Duga kosa, kratka pamet.
long hair, short intelligence
- (17) a. Wo dua, wo twa. (Twi)¹¹
you sow you reap
- b. Wo hwehwea, wo hu.
you seek you find
- (18) a. Bene diagnoscitur, bene curatur. (Latin)
well diagnosed well cared-for
- b. Cito maturum, cito putridum.
early ripe, early rotten
- c. Qualis rex, talis grex.
like king, like people
- d. Ubi fumus, ibi ignis.
'Where there is smoke, there is fire.'
- (19) a. ua noj ua haus (Hmong)¹²
make eat make drink
'to earn a living'

¹¹ Twi is spoken in Ghana, and the examples were kindly provided by Kingsley Okai (p.c. 2011).

¹² Hmong is spoken in southern China and northern Southeast Asia, and the data are taken from Mottin (1978) and Johns and Strecker (1982). Thanks to Martha Ratliff (p.c. 2013) for leading me to the Hmong data, as well as for providing the background for understanding them. Hmong has thousands of

- b. kav teb kav chaw
 rule land rule place
 ‘to rule a county’
- c. cua daj cua dub
 wind yellow wind black
 ‘a storm’
- d. ua tsov ua rog
 make tiger make war
 ‘make war’
- e. kev tshaib kev nqhis
 way hunger way thirst
 ‘famine’

It is clear how paratactic Conjoin brings about an advantage over no combinatorial capabilities: the emergence of the paratactic syntactic stage (e.g. 14) does not eradicate the possibility in (13) to use the clauses as separate utterances. Rather, with two possibilities now available, to Conjoin and not to Conjoin, we can now more easily distinguish between two unrelated propositions (13), and utterances that introduce two propositions in a causal/temporal relationship (14). If so, then Conjoin affords a concrete expressive advantage which could have been targeted by natural selection. Still, without specialized functional elements, this paratactic grammar cannot be fully explicit about the nature of the relations between clauses. Instead, such relations seem to be inferred iconically. Iconicity here is reflected in the requirement to express the condition/cause before the outcome, as will be discussed further below. Deutscher (2000) argues that the development of finite subordination had an adaptive advantage in that it broke away from such iconicity.

A comparable kind of advantage is brought about clause-internally. While one can express a variety of thoughts with one-word utterances (20), bringing two words together by Conjoin into a single utterance (21) begins to create tighter connections, paving the way toward (proto-)predication.

(20) Fall. Snow.

such creative binary paratactic creations. Even though the Hmong examples seem to create complex vocabulary items as opposed to conditionals, their structure is parallel to the examples from English and Twi, in that they are of the AB AC form. Some of these are frozen expressions (the one for “storm,” for example) and are passed down from generation to generation, but good speakers will make up new ones that are easily interpretable. Just 60–70 years ago Hmong was a totally unwritten language, so for millennia language skill equaled oral skill, and making up new, good ones was highly valued (Martha Ratliff, p.c. 2013).

That Hmong speakers use these AB AC structures productively is shown by Mortensen (2014), who considers a 17 million-word corpus based on Hmong text from the soc.culture.hmong Usenet group. The corpus yielded 16,106 valid tokens and 3,253 types of AB AC expressions.

(21) Fall snow.

While the two separate utterances in (20) can express that there is somebody or something that fell, perhaps because of the snow, or perhaps the snow fell, the small clause in (21), created by Conjoin, is more likely to be interpreted as snow being directly involved in the act of falling. Here, again, Conjoin provides an additional expressive capability, which contrasts with the more vague possibility in (20), which still remains available.

However, as pointed out by a reviewer, some syntacticians claim that words cannot exist in isolation, as words have valence, that is, they are taken from the lexicon (mental dictionary) with various grammatical features which dictate that they combine with certain other words. In this particular case, the idea would be that the word *fall* must combine with a subject (e.g. *snow*), as well as with Tense, in order to express an assertion. In this view, neither (20) nor (21) can make assertions. For example, Piattelli-Palmarini (2010: 160) considers that words themselves are syntactic entities and that it is “illusory” to think that as such words can exist outside of full-blown syntax, or that any protolanguage can be reconstructed in which words are used, but not full-blown syntax.

On the other hand, Bickerton (2014: 89) points out that these early words could have been different from modern words; perhaps they were “mere lexical shells,” without grammatical features. It is also important to point out that even present-day adult speakers often use one-word utterances (e.g. *Me! Fire!*), which need not be analyzed as elliptical, that is, as derived from full sentences by ellipsis (see Progovac 2013a for an overview of this issue and for references). It is well-known that words sometimes have a special form when used in isolation, and such forms have been analyzed as default forms (see e.g. Schütze 2001; Section 2.2), that is, as forms with unspecified grammatical features. These default forms are used exactly in those situations in which syntactic rules cannot reach them, including in isolation. In other words, Piattelli-Palmarini’s claim is not necessary even for present-day languages, as even present-day languages allow words to be used in isolation. This leaves the door wide open for a one-word stage in language evolution.

The usefulness of paratactic grammars is also very obvious with exocentric VN compounds. Progovac (2009a, 2012) and Progovac and Locke (2009) argue that the ability to use the kind of paratactic grammar characterizing exocentric compounds may have been sexually selected, and that some modern languages may still preserve evidence of such selection. As discussed in much detail in Chapter 6, these compounds seem to be the only well-defined morpho-syntactic construction that specializes for derogatory reference/insult. It is also the construction that most neatly falls under the umbrella of a paratactic, exocentric, intransitive, absolutive-like grammar (see Chapter 3 and Chapter 6).

- (22) scare-crow, kill-joy, pick-pocket, cry-baby, spoil-sport, turn-coat,
rattle-snake, hunch-back, dare-devil, wag-tail, tattle-tale,
Drynk-pany (miser), Pinch-penny (miser), busy-body
- (23) ispi-čutura (drink.up-flask—drunkard), guli-koža (peel-skin—who
rips you off), cepi-dlaka (split-hair—who splits hairs), muti-voda
(muddy-water—trouble-maker), jebi-vetar (screw-wind—
charlatan), vrti-guz (spin-butt—fidget), tuži-baba (whine-
old.woman; tattletale) (Serbian)

The argument is that one can create much more colorful and creative (ritual) insults with two-word concatenations than one can ever do with just single words. The reader can try to find one-word (non-compound) equivalents to the concepts expressed with the metaphorical compounds above. The chances are that either the alternatives of that kind do not exist, or if they do, that they are too dry or abstract, and not likely to have existed in the initial stages of language. On the other hand, one should notice that the pieces of exocentric compounds (e.g. wind, cry, rattle, wag, peel) tend to be rather concrete concepts, much more likely to have existed at the early stages of language evolution. It is fascinating to observe how the simplest combinations of these most basic pieces are able to yield truly complex and abstract concepts, which can serve amazingly well as insults. But such combinations can also be useful for providing more precise descriptions of animals, as is the case with e.g. *rattlesnake*. Paratactic grammar in this particular domain would have thus constituted a true breakthrough in human expressive capabilities, clearly something that could have, and would have, been subject to selection, as discussed in Chapter 6, as well as in Chapter 7.

4.2.3 Absolutes and correlatives: More on Conjoin

As established in the previous section, when two small clauses combine paratactically, they appear to be on an “equal footing” with respect to each other as far as syntax is concerned, and their relationship is then interpreted as one of temporal ordering and/or causation, expressed iconically by the relative ordering of the two clauses.

On the other hand, when a bare small clause attaches paratactically to a finite sentence/TP, in an unequal act of union (24 below), such a small clause is perceived as an adverbial/adjunct, which again usually receives temporal/causal, or some other modifier-like interpretation. In his detailed consideration of absolute constructions (not to be confused with absolutives), such as the underlined clause in (24), which can also be characterized as involving operation Conjoin, Stump (1985: 302) concludes that the logical relation between the absolute and its superordinate clause is often determined inferentially. He defines “inference” as “anything which is not part of the literal meaning of some expression but which language users judge to be part of the intended meaning of that expression” (304).

- (24) She clapped her hands like a child, her lucid eyes sparkling.
(Stump 1985: 332)

Jackendoff (2002) also considers similar small clause attachments in (25) and (26), suggesting a possible pre-TP stage in the evolution of human language:

- (25) [Us having left], he reverted to his old ways.
(26) [Him having gone to Rome], I can now focus on my work.

As opposed to the symmetric parataxis illustrated in (15–19), the interpretation in this case is no longer determined by the relative ordering of the two clauses, but is at least partly determined by their unequal grammatical status, again iconically: the finite clause serves as the main clause because it is grammatically the fuller one, and the small clause just provides some temporal and/or causal modification of the main clause. Even if the ordering is reversed in (27–28), the interpretation remains the same. This is in contrast to symmetric clause combinations, which are directly affected by such reversals of order (29):

- (27) He reverted to his old ways, [us having left].
(28) I can now focus on my work, [him having gone to Rome].
(29) ?Nothing gained, nothing ventured.
 ?Easy go, easy come.
 ?Monkey do, monkey see.
 ?Come all, come one.

The analysis of (15–19) as simple concatenation/parataxis may be called into question by some recent analyses of correlative constructions of the type illustrated in (30) below:

- (30) The more you read, the less you understand.

Culicover and Jackendoff (2005: 508) argue that such correlative constructions involve a paratactic (quasi-coordinate) syntax with conditional semantics. However, den Dikken (2005: 503) responds that their approach “condone(s) a mismatch between syntax and semantics” and proposes a syntactically more complex derivation (see also Smith 2010 and Citko 2011 for an overview of various approaches). The conditional semantics, however, does not follow even from den Dikken’s treatment of correlatives, as he himself acknowledges. But, at any rate, this same friction between syntax and semantics seems to carry over to my examples in (15–19).

First of all, at least in the case of examples such as (15–19), one is not dealing with a mismatch, but rather with underspecification/vagueness, just as one is not dealing with a mismatch in the case of absolute constructions. The paratactic attachment only signals that there is a relationship between the events in the two clauses, but it

does not specify the nature of that relationship. According to Culicover and Jackendoff (2005: 528), parataxis is “grammatically the most primitive way to combine linguistic elements, one that leaves the semantic relations among the elements to be determined by their inherent semantic possibilities or by pragmatic considerations.” As pointed out above, concatenations such as (15–19) typically rely on iconicity of word order to express temporal and/or causal relations, rather than on any syntactic devices (see also Stump 1985: 307; Deutscher 2000).

This is also the case with constructions akin to serial verb constructions, as discussed in Chapter 3, Section 3.4.1. One example is the concatenation of two intransitive clauses (e.g. WOMAN PUSH, MAN FALL), meant to express a transitive event in Nicaraguan Sign Language. Comparable to the examples in (15–19), such combinations are also interpreted iconically, in the sense that the first clause acts as the cause for the second (and the order is not reversible). If transitive constructions ultimately derive from such paratactic sequences, then this would explain the overwhelming tendency in world languages for agents (which are typically causers) to precede patients/objects in transitive constructions. Perhaps this could even obviate the need for a separate Agent-First principle, as discussed in Section 1.6.

Furthermore, the correlative structures in (30) are clearly more complex than the paratactic attachment of small clauses in e.g. (15), both clause-internally and clause-externally (see especially Smith 2010). Internally, both clauses in (30) are finite, showing tense and agreement, as well as a left-peripheral position before the subject, which may implicate Move, or at least a(n additional) functional projection above TP. In contrast, the small clauses in (15) are just that— small clauses which show no tense, no agreement, and no Move. Externally, each of the small clauses in (15) can be a root construct on its own, not requiring another clause to complete it (e.g., *Nothing ventured!*) This is *not* the case with the correlative constructions in (30), whose individual clauses are clearly dependent (**The more you read*), possibly suggesting some additional external mechanism of clause cohesion, not available in (15).

This is not to deny the obvious similarities between the constructions in (15) and the correlatives in (30). The correlatives in (30) may represent modern complications of ancient correlatives, the latter more closely approximated by the examples in (15), but the examples in (30) still showing some elements of proto-syntax. Citko (2011) also concludes that correlative structures are somewhere between parataxis and hypotaxis. Notice that such clauses still depend iconically on the relative ordering:

(31) The less you understand, the more you read.

(31) is interpreted very differently from (30). This is in contrast to clearly subordinated structures (32) below, which do not depend on relative ordering:

(32) If you read more, you understand less.
You understand less if you read more.

The issue of vagueness and underspecification deserves special attention in an evolutionary framework (see also Chapter 3). If language evolved gradually, then it is to be expected that not all the grammatical tools that we use today to express various relations with some precision were available in the previous stages of grammar. This should not have prevented our ancestors from speaking in however imprecise and vague ways. It is also important to keep in mind that, however precise we may believe that our language is today, it is still extremely underspecified with respect to so many distinctions that could in principle be made, and which are made in some languages, but not in others (see e.g. Gil 2014).

The ever-increasing precision in what we can express with language, and the increasing match between syntax and semantics, may have marked *one* of the directions in which language evolved. But there is no reason to believe that a perfect syntax–semantics match will ever be achieved (see e.g. Francis and Michaelis (2003) which focuses on various incongruities of this kind), or that it is even desirable to achieve (see e.g. Bouchard 2013). As pointed out throughout the book, even when more precise means are available in languages, speakers often resort to simpler, vaguer expressions, such as middles in Serbian. In languages like English, which does not have comparable middles, one often uses passive forms, whose end result is the suppression of the agent, that is, less precision in characterizing the argument structure.

In conclusion, postulating a paratactic stage in the evolution of syntax is supported by the “living fossils” of this stage found in abundance in modern languages (e.g. root small clauses, their paratactic combinations, and exocentric compounds). In addition, Section 4.5 identifies corroborating evidence from ancient languages, grammaticalization processes, language acquisition, comparative animal studies, and neurological studies, including the processing of intonation and prosody. It is of note that paratactic grammars cannot be manipulated by Move. This feeds into my proposal in Chapter 5 on Subjacency that Move is a later evolutionary innovation, which arguably emerged together with hierarchy (also Section 4.4.5). The following subsections, 4.3 and 4.4, consider how paratactic constructions provide a foundation, a scaffolding, for the coordination and subordination structures.

4.3 The proto-coordination stage

As pointed out in the previous section, paratactic combinations rely solely on prosodic, supra-segmental information to provide evidence of proto-Merge (Conjoin). If the advent of proto-Merge, that is, the beginning of proto-syntax, was a particularly advantageous development in the evolution of human language, then one can see how providing more robust and unambiguous evidence of such an operation would have been beneficial. The proposal here is that proto-conjunctions, the all-purpose linking categories, evolved as a result of the pressures to consolidate

proto-Merge/Conjoin. Such proto-conjunctions/linkers added all-purpose *segmental* glue to the already available prosodic glue characteristic of the paratactic stage, providing now two indicators of proto-Merge, both segmental and prosodic. Two mechanisms will necessarily yield more robust evidence for Merge than just one of them alone (it is also possible that segmental glue (conjunction/linker) by itself provides a more salient cohesive mechanism than prosody). It may have been only later that such proto-coordinators/linkers differentiated into specific functional categories, such as aspect markers, tense markers, or complementizers, as discussed in Section 4.4.

There may have been other advantages to the emergence of (proto-)conjunctions, such as the ability to use different types of conjunctions, not just the neutral connective *and*. As pointed out in Payne (1985: 9) and references cited there, in languages such as Vietnamese and Japanese, a coordinator is used for the adversative conjunction comparable to English *but*, even though in non-adversatives the strategy involves simple juxtaposition (parataxis) of the “conjuncts,” with no intervening conjunction.¹³ This highlights the continuity/fluidity between parataxis and coordination, as already discussed in Section 4.2.¹⁴

According to Payne, the paratactic strategy, where the “conjuncts” are simply juxtaposed, with no additional markers of conjunction, is probably available to all languages. This would be expected under the evolutionary scenario explored in this book, according to which parataxis preceded, and provided the necessary scaffolding for, both coordination and subordination structures. In many languages, such as for example Turkish, parataxis is a normal alternative to coordination, existing side by side with other strategies. The classical languages, including Sanskrit and Latin, also widely use the juxtaposition (parataxis) strategy at the expense of coordination (Payne 1985: 25). The two strategies are obviously in competition, and are not at all clearly demarcated, exactly the kind of overlap expected under an evolutionary scenario outlined in this book.

Just a cursory look at some very common data in English can illustrate the ambivalence and overlap between the two processes:

- (33) a. The tall, elegant lady carried a heavy suitcase.
 b. The tall and elegant lady carried a heavy suitcase.

¹³ One also finds combinations of both the neutral conjunction (*and*) and an adversative conjunction in e.g. English *and yet* and Standard Arabic *wa lakin* “and but,” as noted in Payne (1985: 15), suggesting that the neutral coordinator can serve as a mere connector/linker, without a specified meaning.

¹⁴ There are also numerous examples across languages which seem to straddle the boundary between parataxis and subordination/complementation. One example is serialization/complementation in Hmong (Martha Ratliff, p.c 2013). According to Jarkey (2006: 129), complementation in Hmong involves a serial-like construction, “a step along a continuum between serialization and complementation in terms of the closeness of the juncture.” Serial verbs are discussed in more detail in Section 3.4.1.

- (34) a. He read the book quickly.
b. He read the book, and quickly.
- (35) a. She visited many cities, including Prague, Paris, Rome, Trieste, Vienna.
b. She visited many cities, including Prague, Paris, Rome, Trieste, and Vienna.
- (36) a. She is tall, elegant, and ambitious.
b. She is tall and elegant and ambitious.

Such examples show that there are contexts in which one can either use a conjunction or not, in constructions that are typically characterized as coordination (see Progovac 2003 and references there for an extensive discussion of the phenomenon). Payne and others refer to this as a paratactic strategy for coordination, again suggesting a lack of clear differentiation between the two. Similar ambivalence is encountered when one tries to distinguish between coordination and subordination in some cases, as pointed out in the next section. This would be surprising if syntax were a perfect and optimal system, engineered from scratch, with adjunction, coordination, and subordination each having their own specific functions. On the other hand, this ambivalence and overlap are exactly what one expects from evolutionary tinkering, if parataxis gradually integrated into coordination, and coordination and parataxis gradually integrated into subordination.

Clausal conjuncts (e.g. *John is here, and Mary is gone*), just like adjuncts (e.g. *John is here because Mary is gone*), have been repeatedly noted in current syntactic literature not to be fully integrated into syntactic fabric (Selkirk 1978; Stowell 1981; Nespor and Vogel 1986; Zec and Inkelas 1990). This is consistent with them sitting in semi-integrated, “non-canonical,” syntactic positions, as put in An (2007). Next, conjuncts have been analyzed in syntax as sitting on parallel planes, that is, in a different dimension (e.g. Goodall 1987), even though this analysis is not widely accepted (see an overview of these issues in Progovac 2003; see also Crysmann 2006 and Citko 2011).

Moreover, c-command, the central postulate of syntax, does not seem to extend into conjuncts or adjuncts in all cases (see Progovac 2003). As discussed in Section 4.4.5, Move targets a hierarchically higher (c-commanding) position, so that the Moved element can structurally command/identify its trace/gap. C-command also regulates other structural relationships, such as the one between noun phrases and co-referring pronouns (Footnote 15), and negation and co-dependent negative polarity items (i.e. items that must be licensed by negation, e.g. *ever*). It is thus of interest that c-command does not extend seamlessly into conjuncts and adjuncts, suggesting that conjuncts and adjuncts are not fully integrated into the layers of syntax. To take one example, while it is possible to license the

negative polarity item *ever* in an embedded subordinate clause (37), it is not possible to do so in a conjunct clause (38) or an adjunct clause (39):¹⁵

- (37) Mary did not say [that she ever met Peter]. *Subordination*
 (38) *Mary did not say it, [but she ever met Peter]. *Coordination*
 (cf. Mary did not say it but she never met Peter.)
 (39) *Mary did not say it, [after she ever met Peter]. *Adjunction*

It is of note that Bruening (2014) has proposed that the principle of precedence is relevant even for sentential grammars (see Footnote 15), and that instead of a purely syntactic principle of *c*-command, one needs a conjunction of two principles: Precede and Command. While he treats Precede as a syntactic principle, the fact that it extends across sentence boundaries (Footnote 15) suggests that this principle has a pragmatic source. Could it be that an ancient, pragmatic principle of precedence got grammaticalized into a structural relation of *c*-command, whose effects are fully observable only in the hierarchical, subordination stage? Interestingly, Bruening proposes that this decomposition of *c*-command allows one to treat coordination structures as symmetrical (352, fn. 7). According to him, what gives an effect of asymmetry in coordinated structures is the precedence, rather than hierarchical asymmetry of conjuncts.

In addition, several theoretical accounts invoke adjunction as an integral part of the analysis of coordination, and/or liken it to subordination (e.g. Munn 1993; Johannessen 1993; Kayne 1994).¹⁶ These analyses are technical, and would take us too far afield to introduce them here, but the reader is referred to Progovac (2003) for a lengthy overview of various analyses of coordination. Suffice it to say here that theoretical analyses of coordination are not able to draw clear distinctions among the three categories under discussion: adjunction, coordination, subordination. In

¹⁵ In a similar fashion, Principle C effects, clearly visible with subordination (i), do not seem to extend into conjuncts (ii): while *she* and *Mary* cannot co-refer in (i), such co-reference is possible in (ii). The judgment is less clear with an adjoined clause in (iii). To me, as well as a native speaker I consulted, it seems that (iii) is slightly better than (i).

- (i) *She_i never mentioned [that Mary_i is a bartender]. *Subordination*
 (ii) She_i never mentioned it, [but Mary_i is a bartender]. *Coordination*
 (iii) ?*She_i never mentioned it, [after Mary_i became a bartender]. *Adjunction*

To complicate matters further, some Principle C effects seem to overlap with the effects of the pragmatic precedence principle, which operates across independent sentences (iv), and can thus not be reduced to *c*-command, which is a sentence-internal principle (see Progovac 2003 for discussion):

- (iv) ?*He_i finally arrived. John_i's cousin accompanied him.

Given this, it is not clear if it is syntactic *c*-command or precedence that excludes co-reference in e.g. (i). Clearly, this issue deserves further investigation. It may be that the grammaticality status of the examples introduced above reflects a curious interplay of more than one factor, including syntactic command and pragmatic precedence, whose domains seem to partly overlap.

¹⁶ See also Schwartz (1989a,b) for the comitative/asymmetric conjuncts.

several other respects as well, the conjunction is a category unlike other functional categories, straddling the boundary between adjunction and subordination. Considerations like this give credence to the gradualist evolutionary approach, for they provide evidence of continuity and overlap among adjunction/parataxis, coordination, and subordination.

Section 4.2 established that the operation Conjoin, which creates paratactic/exocentric structures, applies both clause-internally and between clauses. I would like to extend this same idea to coordination, and tentatively suggest that even predication may have, at least in some circumstances, passed through a proto-coordination (linker) stage in the evolution of human language. The fossils of such processes are not as easy to find as they are for clausal combinations, but there are some constructions that can be considered as such fossils. For example, German incredulity root small clauses take an optional conjunction (see Potts and Roeper 2006; also Progovac 2006, 2009b):

- (40) Ich (und) Angst haben? (German)
 I (and) fear have._{INF}
 'Me afraid?!'

The German small clause above seems to preserve both the paratactic option (without a coordinator) and the coordination option, the latter just adding a meaningless coordinator/linker to solidify the connection between the subject and the predicate. In a similar fashion, Akkadian, a Semitic language spoken between c. 2,500 and 500 BC, used the coordinative particle *-ma* in predicative functions (41), as reported in Deutscher (2000: 33f.). The absence of a verbal copula suggests the use of root small clauses:

- (41) 'napišti māt-im eql-um-ma
 soul.of land.GEN field.NOM.CONJ
 'The soul of the land is the field.'

In addition, Bowers (1993) analyzes English *as* as a realization of the head of Predication Phrase, whose purpose again is merely to link the subject with the predicate:

- (42) She regards [_{sc} Mary as a fool/crazy.]

Of note here is that English *as* (as well as Akkadian *-ma*) can serve as glue for both predication (interclausally, as in (41, 42)) and to connect clauses (extraclausally, as in English (43)):¹⁷

¹⁷ It is also reported in Mous (2004: 121) that Alagwa (Cushitic language spoken in Tanzania) uses the same morpheme for both conjunctive functions and as a copula. See also Newman and Newman (1977: 21–2) for the *dà* in Hausa, a Chadic language spoken in Africa; also Gil (2004) for various functions of *sama* in Riau Indonesian.

- (43) a. Peter will be late, as will John.
 b. The door opened as she was approaching.

Note also that *as* is used to solidify/cement predication only in small clauses, where, arguably, there are no specified functional projections, such as TP, which can serve the purpose. It is also worth pointing out that *as* in (43) seems to straddle the boundary between a coordinator and subordinator.

In descriptions of various linguistic phenomena one finds reference to “linking” words or morphemes, which do not seem to have any specific meaning. To take just one recent example, den Dikken (2006: 245) devotes his whole book *Relators and Linkers* to such “meaningless elements (meaningless in the sense of having no semantic load) that play an essential role in the establishment and syntactic manipulation of predication relationships.” As he puts it, “relators and linkers are the vital syntactic *cement* of predication relationships” (249). He goes on to say that all subject-predicate relationships are mediated by such relators, whether overt or covert.

Little words like *as* in English can also be seen as a kind of linker, whether it is used to link a subject and its predicate (42), or to link two clauses (43). In its former function it can be likened to a copula, while in the latter function it can be likened to a conjunction, or subordinator, but the claim here is that this is a reflex of a pattern in which such distinctions were not made.¹⁸ Moreover, as argued in e.g. Vossen (2010: 47), there is a “linker” *a* in Central Khoisan, Kalahari branch of Khoe, spoken in southern Africa, which, at least at the synchronic level “has no recognizable meaning nor does it reveal a definite grammatical function.”¹⁹ This is so because it is found “linking” various kinds of grammatical elements (all-purpose linker), including the verbal base to the following tense-aspect marker; or a verb and the dative argument (Daniel Ross, p.c. 2013).

- (44) a. x’úú-wá-hã
 kill-LINKER-PRETERITE
 b. gòm-á-mà
 smoke-LINKER-DATIVE
 ‘to smoke for’

Heine (1986) has argued that the linker (or juncture, as it is sometimes referred to) is a grammaticalized copula, which still exists as such in most Kalahari Khoe languages.

¹⁸ Also, the copular verb *be* appearing between the subject and a non-verbal predicate, as in English *John is happy*, is traditionally referred to as a “linking verb.” This kind of verbal linker is typically absent from small clauses (e.g. *I consider John happy*), and is also not used in all languages, or with all tenses in a given language, as discussed in Chapter 7.

¹⁹ Another example of a linker is the (in)famous particle *de* in Chinese, as described in e.g. Cheng (1986).

At the same time, Elderkin (1986) has argued that the linker derives historically from a conjunction. Even though these two proposals seemingly compete with each other, my approach suggests that they can both be correct: the linker was at one point the proto-coordinator, used both to connect the subject and the predicate (copular use), and to connect other constituents.

According to Schneider-Zioga (2013), the Bantu language Kinande, spoken in Congo, has a linker which occurs between internal arguments (e.g. direct and indirect objects), and sometimes between adjuncts or between an internal argument and an adjunct. She shows that the function of this linker cannot be reduced either to a case marker or to the distinctness condition, but rather remains just a copula, or rather a linker, as copula is the term usually reserved for the linker between the subjects and predicates. What these data show is that other constituents in a sentence, including objects and adjuncts, can also be linked to the rest of the sentence via linkers/specialized copulas.

The proposal of this chapter is that those kinds of all-purpose proto-linkers can grammaticalize into more specialized functions, and moreover different functions in different languages. The most prototypical of these linkers is arguably the conjunction such as *and* in English, which is still characterized by a significant amount of promiscuity and possibly by the lack of meaning above and beyond mere linking. If one can now imagine a grammar where this kind of linker is even more promiscuous and devoid of meaning, and which can link any two constituents, including the subject and the predicate, then this would be the all-purpose proto-conjunction hypothesized in this chapter. The main reason to refer to these linkers as proto-conjunctions is that, in modern languages, conjunctions are used in more linking functions than other (functional) words, approximating the proto-conjunction markers better than other words.

Likewise, one finds a variety of so-called linking morphemes in compounds across languages (e.g. linking “o” in *speed-o-meter*; *Graec-o-Roman*; *palat-o-alveolar* in English; *kiš-o-bran* (rain-o-guard, umbrella); *kamen-o-rezac* (stone-o-carver) in Serbian; linking “s” in Germanic compounds, e.g. *tabak-s-rook* (tobacco smell) in Dutch; *Himmel-s-tor* (heaven’s door) in German; *hunt-s-man* in English. Linking “o” is very common across Slavic, as well as in Greek. It is also found in Romance languages. All these constructions may be frozen somewhere at an intermediate proto-coordination stage, some place between parataxis and a specialized functional category stage. Recall that the VN compounds such as *pick-pocket*, discussed in Section 4.2, have no linking morphemes, and are characterized as paratactic, which in my analysis renders them simpler, more primary than the compounds involving linkers.

In sum, this section hypothesizes that (proto-)conjunctions/linkers may have been among the first functional categories to emerge, for the primary function of solidifying Merge, that is, of providing more robust evidence of Merge than just prosody

(supra-segmentals) can do. Finally, if the emergence of parataxis already proved advantageous to our ancestors as they advanced to the first syntactic stage, then providing more robust and unmistakable evidence of such (proto-)syntax, by introducing linkers (coordination stage), would have constituted a clear and concrete benefit, which could have been subject to natural selection.

Section 4.5 considers some corroborating evidence for a proto-coordination stage, mostly based on language acquisition. Evidence for a proto-coordination stage at the level of predication is not as robust as evidence for a paratactic stage. It may be that the proto-coordination stage at the predication level was a brief, fleeting stage, which quickly led to the appearance of specific functional categories. It is also probable that this stage was optional, that is, that not all languages/constructions needed to proceed through this stage, as it should be possible to evolve a specific functional category without first evolving a conjunction-type linker (see Section 4.5). In contrast, the paratactic stage is the foundational stage, upon which everything rests, and the evidence for parataxis providing a scaffolding for other structures is overwhelming.

4.4 The specific functional category stage

4.4.1 From linkers to specific functional categories

Finally, certain categories, including linkers/conjunctions of the proto-coordination stage, would have grammaticalized into specific functional categories, such as predication head or tense or subordinator/complementizer—another syntactic breakthrough and the beginning of modern, hierarchical syntax, which can now not only use functional words as glue to connect words/phrases/clauses, but which can also use them to build specialized, hierarchical functional projections, such as TP and CP. A modern functional category such as a copular verb (head of TP), or a complementizer (head of CP), can be seen as providing not only segmental evidence of Merge (interclausally with TPs and extracausally with CPs), but also, simultaneously, an expanded structural space, which can now accommodate Move.

These specialized functional projections not only provide landing sites for Move, but also motivation for Move. Recall from Chapters 2 and 3 that the subject of the clause Moves out of the SC layer only after the TP layer is projected on top of the SC. In other words, the SC layer by itself does not exhibit the Move of the subject. In this case at least, syntactic theory considers that Move is driven by the need of the higher layer, TP, to have its own subject. In some very abstract sense, then, Move serves to connect the layers of structure, and such layers only become available in the hierarchical stage. Another example would be the Move of the verb (V) into the light verb (v) position, and in some languages and some circumstances the verb is taken to Move even higher, to T or to C (see Section 4.4.5 for more discussion). Likewise, the CP position is typically the target of *wh*-movement, as discussed at length in Chapter 5.

For concreteness, suppose that a linker comparable to *as* was used as all-purpose glue in the proto-coordination stage, both to connect words into clauses, and to connect clauses, as the following repeated examples from the previous section illustrate.

- (45) She regards [_{sc} Mary as a fool/crazy.]
 (46) Peter will be late, as will John.
 (47) As she was approaching, the door opened.

In (45) *as* acts as a linker between a subject and its predicate; in (46) *as* is akin to a conjunction, connecting two clauses; and in (47) *as* is more like a subordinator/complementizer, even though the latter two functions are not clearly distinguished.²⁰ Now, the function (as well as the phonological shape) of this linker could have diverged in these different positions to specialize either for predication/tense/aspect marking, or for clause cohesion, the developments which would now signify the beginning of the subordination stage, i.e. specific functional category stage. In this stage, the linkers are not only there to provide segmental glue, but also to illuminate the nature of the link (e.g. predication vs. clause combination), and to provide more specific information about the link, such as information about present vs. past tense in the case of predication, or causation vs. temporal event ordering in the case of clause combination.

To appreciate the three stages, also reported in the processes of grammaticalization of subordination in e.g. Traugott and Heine (1991) and Deutscher (2000), consider the following examples which seem to range from least syntactically integrated (48, parataxis), to most integrated (50, subordination), with coordination (49) straddling the boundary between the two:²¹

- (48) Marc is a linguist—(as) you know. *Parataxis*
 (49) Marc is a linguist, and you know it. *Coordination*
 (50) You know that Marc is a linguist. *Subordination*

²⁰ Potts (2002) analyzes *as* clauses such as (i) below as syntactically quite complex, involving movement and CP integration. In fact, he treats *as* in such clauses as a preposition, which selects a CP.

(i) As the FBI eventually discovered, Ames was a spy.

In contrast, others have analyzed parentheticals in general as involving a loose concatenation of two independent sentences, which is how parataxis is often understood (e.g. Emonds 1976: 52–3; Haegeman, Shaer, and Frey 2009). Asher (2000) also discusses *as* parentheticals in this light. Resolving this issue is beyond the scope of this book. The purpose here is only to illustrate how certain words in today's languages might approximate multi-functional linkers, rather than to provide an in-depth analysis of English *as*.

²¹ The following example may also be seen as involving parataxis, but in a clause-internal position:

(i) Marc, (as) you know, is a linguist.

Notice that *as* in (48) is itself an intermediate category bridging the gap between true parataxis (without *as*) and true coordination (49).

In these combinations of only two clauses, the three different syntactic strategies for clause union result in roughly the same interpretations. This is not surprising under the evolutionary “tinkering” scenario explored in this monograph, in which conjunctions/linkers emerge just to provide additional (segmental) evidence of union, on top of the prosodic evidence which already characterizes parataxis. The specified functional categories then arise, characterized by a more specific meaning/function.

Such tinkering would have left us with multiple possibilities which partly overlap in function, that is, with redundant means for expressing similar meanings (48–50). One wonders, then, what concrete communicative advantages might have been gained by the subordination stage (50) over the two previous stages (48, 49). The following sections discuss this issue in relation to CP recursion (4.4.2) and DP recursion (4.4.3), to shed light on the question of what it takes to realize recursion in syntax.

4.4.2 CP and recursion

Recall from Chapter 1 that I adopt the traditional characterization of recursion, also adopted in Kinsella (2009), according to which recursion is defined as the embedding of a constituent of a certain syntactic category (e.g. a clause/CP) within another constituent of the same category (another clause/CP). Traditionally, this operation is taken to automatically apply in an unlimited fashion, given that one embedded CP can always feature another embedded CP inside it, and so on, as in (53) below. This was the traditional way to “prove” the existence of infinite recursion. In other words, recursion in this characterization has two components to it: the same category embedding, and the unlimited reapplication of this kind of embedding. This characterization coincides with what Heine and Kuteva (1987) call productive recursion, as will be discussed in Section 4.4.3.

As it turns out, in addition to facilitating Move, including Move across clause boundaries (see Chapter 5; Section 4.4.5), the subordination stage also provides a recursive mechanism for embedding multiple viewpoints within one another, unavailable with either coordination or parataxis/adjunction, privileging in this respect (53) over (51–52).

- (51) a. ?Marc is a linguist—[you know,] [Mary knows].
b. Marc is a linguist—[you know it,] [Mary knows it].
- (52) Marc is a linguist, [and you know it,] [and Mary knows it].
- (53) Mary knows [that you know [that Marc is a linguist]].

Only (53) allows one to report on one person’s knowledge about another person’s knowledge, unambiguously and recursively.

As the bracketing notation indicates, while in (53) each embedded clause is an integral part (complement/object) of the higher clause, showing subordination

(hypotaxis), in (51) and (52) the clauses are strung *next to* each other (parataxis). Kinsella (2009) discusses the distinction between iteration, characteristic of coordination, and true embedded recursion. As she puts it, “the difference between iteration and recursion is this: the former involves mere repetition of an action or object, each repetition being a separate act that can exist in its entirety apart from the other repetitions, while the latter involves the embedding of an action or object inside another action or object of the same type, each embedding being dependent in some way on the action/object it is embedded inside” (115).²² In this sense, (51–52) should be analyzed as involving iteration, rather than true recursion.

However, a reviewer points out that, with some elaboration, coordination may allow for multiple embedding of one viewpoint within another, as in the following example, which places prosodic prominence on *that*:²³

(54) [?]Marc is a linguist, and you know it, and Mary knows **that**.

So, at least with coordination, one can find a way to tinker with the utterance until it expresses two levels of embedding, with the help of prosody and the alternation between *it* and *that* referring to the main clause, as per Footnote 23.²⁴

But even with these tools, first of all, the sequence in (54) does not guarantee the interpretation in (53), as other interpretations are possible, too. Second of all, the lack of syntactic precision becomes even more obvious when one attempts recursion beyond the two levels. Let us show this by attempting two more levels of embedding, contrasting the coordination strategy in (55), with the subordination strategy in (56):

(55) [?]Marc is a linguist, and you suspect it, and Mary knows **that**, and Steven really believes **that**, and Peter wonders about **that**.

(56) Peter wonders [_{CP} if Steven really believes [_{CP} that Mary knows [_{CP} that you suspect [_{CP} that Marc is a linguist]]]].

²² Kinsella further notes that, unlike iteration, embedded recursion involves keeping track or adding to memory using a stack (116). In other words, tracking recursive structures poses a challenge to our processing abilities the way that iteration does not, to be discussed further below in the text. This is why it is so helpful to have a designated functional projection such as CP, which unambiguously tracks an embedded recursive process.

²³ What makes this possible in (54), but much less so in (52), is the alternation between *it* and *that*, both of which can refer to a clause. Using the same pronoun (*it*) suggests that one is referring to the same main clause (*Marc is a linguist*) in both cases. On the other hand, alternating *it* and *that*, and placing special emphasis on *that* in the second coordinated clause, suggests that whatever *it* refers to, *that* contrasts with it, and refers to something else. This something else can then be a combination of the first two clauses, although it need not, and other possibilities for the interpretation of *that* are certainly also available. This is another example of an underspecified structure, subject to vagueness.

²⁴ To the extent to which there is a contrast in acceptability between (54) in the text and (i) below, it might suggest that coordination is a bit more flexible than plain parataxis in this respect:

(i) ^{??}Marc is a linguist, you know it, Mary knows **that**.

The more levels of embedding, the more clear it becomes that (55) is not a great strategy for embedding multiple viewpoints one within another, while (56) is specialized to do just that, in an unambiguous and streamlined way. Whatever (55) means, it is hard to see how it would be used successfully to express the meaning in (56). (55) does not exhibit true recursion in the sense above.

In the same vein, in the paratactic example in (48), the two clauses should be analyzed as occurring next to each other, loosely conjoined, in the sense of iteration, rather than true recursion. The nature of the semantic link between the two clauses will then be figured out pragmatically. However, if there are multiple links to figure out, that is, multiple clauses strung together, then this becomes a processing game of guessing, familiar from Section 3.1 with examples such as *No come, no money, no shelter*. In that sense, a specialized, designated functional projection such as CP, whose processing is streamlined, can circumvent the more scattered processing strategies associated with Conjoin (see also Section 7.3.4).

Suffice it to say here that this is exactly what evolutionary forces can operate on: there is already a precursor to recursion, that is, a precursor to the ability to embed one viewpoint within another, but it is only good for one or two levels of such embedding, and it is never unambiguous. In contrast, CP subordination, which specializes for this kind of embedding, gives rise to infinite recursion, exactly because it can circumvent the imprecise processing strategies based on Conjoin. This is the sense in which gradual, step-by-step evolution should be understood: a new stage does not bring about something totally new, but something just a bit more streamlined. The following section explores recursion associated with the Determiner Phrase (DP).

4.4.3 DP and recursion

In addition to recursion associated with CP embedding, recursion is also often illustrated for English with possessive structures, such as:

- (57) a) Peter's brother
 b) Peter's brother's cat
 c) Peter's brother's cat's toy

Here, one DP (Peter's) is embedded within another DP (Peter's brother), which in turn is embedded within another DP (Peter's brother's cat), and so on, illustrating a true recursive process that can keep going. It exhibits both of the elements of the traditional characterization of recursion: the same category condition, and the potential for unlimited reapplicability. And from the point of view of an English speaker, this may seem like no big deal—of course you can keep embedding one possessive within another, and why not conclude from there that this is just unbounded, recursive Merge at work? And why not also conclude that the recursive Merge here reflects our recursive cognitive abilities?

Interestingly, however, Heine and Kuteva (2007) introduce a distinction between productive recursion, as attested with English possessives (57), which can apply multiple times, and one-level recursion (simple recursion), which can only apply once, which they illustrate with German possessives (58):

- (58) a) Peters Bruder
 b) *Peters Bruders Auto

Despite great surface similarities between the two languages, German possessive structures of this kind cannot be repeatedly embedded one within the other, and the question is “why not?” Given the characterization of recursion I am adopting, the German example does not in fact involve recursion: one of the two conditions is clearly not met: the unbounded nature of recursion.

This in itself should be enough to illustrate that just having Merge is not enough to guarantee recursion, and that there is crosslinguistic variation even between closely related languages in this respect. It must be that English and German are using different syntactic strategies to the same end: one happens to be recursive, and the other is not. While determining exactly what these different syntactic strategies are is an ongoing topic in syntactic theory, the discussion in the previous section suggests that what Heine and Kuteva (2007) call simple recursion may be a symptom of a paratactic (iterative) strategy, rather than true embedded recursion (see also Section 4.5.1.1 for parataxis which can be mistaken for subordination in PIE).

To complicate matters further, Serbian, just like German, does not show recursion of possessives (59), even though it is possible to express one level of possession (60):

- (59) *Milenina mamina knjiga. / *moja mamina knjiga.
 Milena’s mother’s book my mother’s book
- (60) a. Milenina mama moja mama
 Milena’s mother my mother
 b. mamina knjiga moja knjiga
 mother’s book my book

In line with the idea that recursion needs to be facilitated by specific functional projections, Bošković (2008, and subsequent work) has proposed that Serbian does not have a DP, which correlates with the lack of definite articles such as *the* in Serbian. This analysis is controversial, but if true, then Serbian cannot use the same DP-within-DP strategy that is used in English for possessives. Instead, Bošković analyzes the possessive in Serbian as an adjective adjoined to an NP. This would then render the possessive attachment close to the Conjoin/Adjoin strategy, i.e. to the iterative strategy in the sense of Kinsella (2009).

According to Bošković (2008), the reason why *Milenina mamina* cannot form an Adjective Phrase (AP) which adjoins to the NP is because adjectives cannot modify

other adjectives. In other words, *Milenina* is not interpreted as being inside the phrase headed by *mamina* in (61), but rather as being next to it, and can thus not yield true recursion, in contrast to English (62):

(61) *_{[NP [? Milenina mamina [_{NP} knjiga]]]} (Serbian)

(62) [_{DP} [_{DP} [_{DP} Peter's] brother's] [_{NP} car]] (English)

Even though German has definite articles, and is thus analyzable as a DP language, it is possible that German uses a similar adjectival strategy for possessives, and treats them as adjoined to an NP.

(63) *_{[DP [_{NP} [? Peters Bruders] [_{NP} Auto]]]} (German)

One can see that the structure in (62) is truly recursive, as far as syntax is concerned, because it involves a repeated insertion of one DP within another. However, the structures in (61) and (63) are not recursive in this way, as they do not involve one DP embedded within another DP, but an adjective adjoined to an NP, a paratactic strategy.

It seems that all hierarchical phenomena considered so far have an alternate, paratactic route, including CP subordination and DP possessive expression. As pointed out in Chapter 3 with respect to serial verb constructions (Section 3.4.1), even transitivity can be expressed with an alternative, paratactic strategy (as opposed to a hierarchical strategy). This is consistent with the proposal in this book that parataxis provided, and continues to provide, a foundation and a precursor for building hierarchical structures. The emergence of transitivity and TP layering will be further discussed in Chapter 7.

4.4.4 Benefits of subordination

As discussed in the previous subsections, recursive syntactic mechanisms have two basic advantages over parataxis and coordination: (i) they allow more levels of (recursive) embedding, and (ii) they provide a more precise, unambiguous mechanism for expressing recursive thoughts. Of course, the hierarchical stage in general has many additional advantages, including the ability to streamline the expression of transitivity and tense marking, as further discussed in Chapter 7.

The subordination stage, a hierarchical, specific functional category stage, can thus be characterized as a stage that facilitates Move, as well as provides a mechanism for true recursion. As pointed out above, at an abstract level, one important function of Move is to connect the layers of hierarchical structure (Section 4.4.5). However, it is important to keep in mind that only those constructions that have reached this hierarchical level can be recursive and subject to Move. Recall the proposal that sentences in modern languages are composite structures, potentially incorporating constructions of all three stages:

- (64) As you may recall, her having left, Peter decided that he wanted to buy a new house, but not in California.

Preceding the main clause (*Peter decided...*), there is an adjoined full TP/CP adjunct/parenthetical (*as you may recall*), followed by an adjoined small clause adjunct (*her having left*), both attached paratactically by Adjoin/Conjoin. The main clause contains a fully subordinated clause (CP), which moreover features coordination inside it (*that he wants to buy a new house, but not in California*). As discussed in Chapter 5, Move is typically not possible out of adjuncts and conjuncts, adjunction and coordination being the most notorious islands for movement. In Chapter 5 I argue that these island/Subjacency effects are epiphenomena of evolutionary tinkering, more precisely, of having such rigid, Move-less structures co-exist side by side more modern structures.

It is also worth pointing out here that the lack of recursion cannot be attributed to cognitive capabilities, or rather to the lack thereof. Just as it was pointed out with respect to the lack of recursion with small clauses, the inability to express true recursion with parataxis and coordination has nothing to do with the speakers' cognitive abilities, and everything to do with the *structure* of these constructions. The claim in this monograph is that the kind of functional structure which enables recursion evolved gradually in the evolution of human language, although it did not emerge with every single construction in every single language (see also Heine and Kuteva 2007).

In this respect, both German and Serbian speakers must be cognitively capable of recursive thought, given that they make use of recursion elsewhere, and yet their possessive structures, as discussed in Section 4.4.3 are not recursive. It cannot be that language is just a passive reflection of thought, equipped with an unbounded Merge, so that, if you can only think an unbounded thought, it will allow you to express it through recursive syntactic means. Instead, language is patched together from various bits and pieces to first allow paratactic precursors to recursion, and then, in some special cases, unlimited recursion.²⁵ This shows that a language can have hierarchical syntax and Merge in the sense of Hauser, Chomsky, and Fitch (2002), but there is still some tinkering to do before recursion in the traditional sense can emerge.

Also consistent with the considerations in this chapter are reports that some modern languages do not make use of finite subordination (e.g. Dixon 1994 for Dyrbal; Mithun 1984, 2010 for various Native American languages). Most recently, Everett (2005) has argued that Pirahã lacks recursion both in the domain of CP

²⁵ It is, of course, misleading to talk here about precursors to recursion, as if German and Serbian and Pirahã (see below) strategies are somehow unstable and awaiting recursion. It is only from the point of view of how recursion comes about that these strategies can be seen as precursors.

subordination and in the domain of possessive recursion, the conclusion also echoed in Sakel and Stapert's work (e.g. 2010); see also Piantadosi *et al.* 2012).²⁶ Newmeyer (2005: 170–1) also leaves the door open for languages to lack subordination, suggesting that this may be correlated with the lack of literacy, considering that CP subordination is mostly used in written texts, and very rarely in everyday conversation. This can serve as a partial answer to a reviewer's question concerning why a human language would not have CP or clausal embedding, if human brains are capable of it.²⁷

4.4.5 Possible precursors to Move

As established so far, the proposed fossils of the paratactic (non-hierarchical) stage are not subject to Move. This is not at all surprising given that Move in the theoretical framework associated with Minimalism has to take a constituent in a certain syntactic position and raise it to a hierarchically higher (c-commanding) position, so that the raised constituent can hierarchically dominate its trace or copy left in the original position. To put it slightly differently, in order to posit that there is a gap (left by Move) in a certain syntactic position, there has to be an automatic, grammaticalized way to identify the position and nature of the gap by a higher constituent, and this kind of command relationship (c-command) is only relevant for hierarchical grammars (see also Section 4.3). Nonetheless, there might be precursors to Move in this paratactic stage, or rather structures that can provide the basis for Move.

One relatively straightforward case would involve a transition from a hypothetical paratactic serial verb sequence (Section 3.4.1) of the kind in (65), to vP transitivity of the accusative type, such as (66).²⁸

- (65) a) [_{SC} Woman push], [_{SC} man fall]
 b) [_{SC} Girl roll], [_{SC} ball roll]

²⁶ The analysis of Pirahã, as proposed in Everett (2005), has been contested by e.g. Nevins, Pesetsky, and Rodrigues (2009) and references there, and is, in general, surrounded by a lot of unpleasant controversy (see e.g. the characterization by Pullum 2012, and the comments there).

²⁷ In this respect, it is important to keep in mind that, whether in evolution in general or in language change, an innovation is typically due to chance, and is not predetermined or predestined. While human beings are capable in principle of inventing a wheel, not all cultures have done that, and certainly not all individuals. We often pose these negative questions, such as how come this language or person does not have this? Or why do certain constructions lack Move? Or, why do certain constructions lack recursive subordination? Or why do some languages lack DP? In fact, on this evolutionary approach, the questions to be posed are of the opposite kind: why is it that certain constructions have Move (Chapter 5), and why is it, and what kind of circumstances needed to be met, for some constructions to become recursive, and for languages to acquire a DP? And what does it take to invent a wheel? For the absence of such rather bizarre phenomena as far as nature is concerned is much easier to understand than their existence.

²⁸ As pointed out in Footnote 25, these can be considered as precursors only from the point of view of the vP accusative structures, which needed that foundation. But these structures are supported by coherent grammars, which can be stable.

- (66) a) [_{VP} Woman push [_{VP/SC} man ~~push~~]]
b) [_{VP} Girl roll [_{VP/SC} ball ~~roll~~]]

The second small clause in the vP structure (66) is now inserted into the higher clause, rather than being next to it (65), which is what creates hierarchy and subordination. In the syntactic theory I am following, the idea is that the lower verb Moves from the position of V into the higher verb position, light v, leaving behind a gap, which is now identified by the higher verb. In this case, the postulated Move accompanies the building of hierarchical structure, whereby the Moved element travels through the layers of structure, providing cohesion among them. This kind of Move seems purely grammatical, without leading to a different semantic or pragmatic interpretation.

Another instance of purely grammatical Move would be the Move of the subject of the SC into the layer of TP in English, as discussed in Chapter 2. Suppose that we start with a hypothetical paratactic sequence in (67), to arrive at the hierarchical structure in (68), in which the initial verb *go* has been grammaticalized into a future tense particle, a common occurrence in grammaticalization. Here, the repeated instance of *boy* can be interpreted as a trace/copy of Move, and thus deleted.

- (67) [_{SC} Boy go], [_{SC} boy hunt]

- (68) [_{TP} Boy go [_{VP/SC} ~~boy~~ hunt]]

As pointed out before, what seems to be captured by Move is the observation that some word or phrase is relevant/interpreted in more than one position in a sentence. In some sense, then, Move is an epiphenomenon of the modest, two-word beginnings of syntax, which could not accommodate all the arguments, or the temporal information, into a single clause. Instead, these types of information can only be provided in separate layers, and Move is that kind of operation which can, metaphorically speaking, run through all these layers, providing syntactic cohesion.

Syntactic theory also postulates Move in cases where the motivation for Move seems to be pragmatic, for the purposes of foregrounding or backgrounding. To take just one example, consider the case of topicalization:

- (69) Mary, I don't like ~~Mary~~.

Here, *Mary* is taken to have Moved from its original object position to the left periphery of the clause (possibly to CP) in order to serve as a topic of the sentence. It is possible that such topicalization structures also have paratactic precursors, which do not involve Move, such as (70) below, typically referred to as left-dislocation:

- (70) Mary, I don't like her.

The attachment of *Mary* in (70) could be by adjunction or parataxis (see e.g. Haegeman, Shaer, and Frey 2009). What is important here is that the position of

Mary in (70) is typically not analyzed as a result of Move, given that there is no gap in the rest of the sentence, but rather there is a (resumptive) pronoun *her*, which refers back to *Mary*. In any event, the kind of Move postulated for (69) can only characterize the stage of hierarchical syntax in which there is at least a TP, but possibly also a CP, to provide a hierarchically higher landing site for Move.

When it comes to Move, McDaniel (2005) considers that protohumans initially produced long, fluent, unstructured strings of words (e.g. 71), essentially Bickerton's (1990) protolanguage, but more fluent. According to McDaniel, when syntax fixed the order (72), it was no longer possible to topicalize an object (e.g. *baby*), but this becomes possible again if Move is introduced (73). The repetition of arguments characteristic of protolanguage can be reinterpreted as copies of Move, and thus provide a precursor for Move (see also the discussion in Bickerton 2012; Tallerman 2014b).

(71) baby tree leopard baby baby kill

(72) leopard tree kill baby

(73) baby [leopard tree kill baby]

At least given the theoretical framework associated with Minimalism, two conditions would need to be met in order for (73) to constitute Move: first, as McDaniel suggests, there would be deletion of the lower copy (avoidance of repetition); and, second, hierarchical structure would already have to be in place in order to be possible to syntactically identify the gap, as per the discussion above. For example, in order to postulate a gap in the object position in (73), one needs to be certain that this is in fact a transitive (vP) structure in the first place, given that an intransitive absolutive-like structure would not have an object position. Likewise, in order for *baby* to be able to c-command the gap in the object position, this already would have to be hierarchical syntax, with *baby* appearing in the highest layer.

In this respect, it is also important to point out that any permutations of word order in the two-word stage (e.g. *Ball roll* vs. *Roll ball*) cannot be considered as Move in the technical sense of Move, as discussed above. Instead, these kinds of permutations would need to be considered as just instances of a single application of the operation Conjoin, which does not impose linear ordering on the constituents.²⁹ In this sense as well, Conjoin is like Adjoin in that it can exhibit different word orderings without implicating syntactic Move (e.g. Adger 2003). Thus, the adverbs

²⁹ As such, different orderings could be used for different discourse purposes of backgrounding or foregrounding, but they could not be considered to instantiate Move. In this respect, Hurford (2012) considers that Move is driven by the desire to change the information structure, for example to express topicalization, new vs. old information, questions, etc. Given my approach, Move can serve these purposes only at a much later stage, necessarily hierarchical, as per the discussion in the text.

below are not analyzed as involving Move, but rather just attachment in different syntactic positions.

- (74) a) Unfortunately, they will have to retire.
b) They will have to retire, unfortunately.
- (75) a) They quickly extinguished the fire.
b) They extinguished the fire quickly.

In other words, not every permutation of constituents is analyzed as syntactic Move, but only those instances in which a constituent travels upwards through (c-commanding) hierarchical layers.

4.4.6 *Transitions and overlaps*

Given this gradualist view, one can expect to find transitional constructions, those straddling the boundary between coordination and subordination, and such constructions are not difficult to find (see Section 4.3 for the overlap between parataxis and coordination). In addition to *as* illustrated there, there are other words that are difficult to classify as either coordinators or subordinators. In the examples below, *but* is analyzed as a coordinator, and *although* as a subordinator. Notice, however, that *although* introduces an adjunct clause, rather than a clause truly subordinated into the matrix clause, once again showing a curious interplay among adjunction, coordination, and subordination.

- (76) He wants to get married again, but this time not in Las Vegas.
- (77) He wants to get married again, although this time not in Las Vegas.

To take another example, the most neutral, prototypical of conjunctions, *and*, can sometimes express subordinating relationships, as discussed in e.g. Culicover and Jackendoff (2005).

- (78) a. Give him an inch, and he will take an ell.
(*Oxford English Dictionary*)
- b. Speak one word, and you are a dead man!
(*Oxford English Dictionary*)
- c. One more can of beer and I am leaving.
(Culicover and Jackendoff 2005: 474)

In (78) above, the relationship between the two clauses is best paraphrased as involving a conditional, *if-then* relationship. Culicover and Jackendoff (2005: 474) call this use of *and* “left-subordinating *and*.” In this use, *and* can be seen as a pure linker/proto-conjunction, linking two clauses. Recall from Section 4.2 that paratactic clause combinations without any linkers (e.g. *Nothing ventured, nothing gained*) also get interpreted as involving causal or conditional relations.

More recently, Ross (2013) has argued that English *and* has undergone a grammaticalization process from a conjunction to a subordinator/complementizer in e.g. the *try and* type of constructions (*I will try and do that*). He ties this with comparable processes of grammaticalization observed in e.g. !Xun (southern African Khoisan language), in which conjunctions become subordinators (Heine and Kuteva 2002: 44):

- (79) yà /oa tci ta yà fia #èhi
 he neg come and he PROG be.sick
 'He doesn't come (because) he is sick.'

A similar process has been observed in Tok Pisin, English-based Creole spoken in Papua New Guinea (Verhaar 1995), as illustrated in the following example from Ross (2013):

- (80) Em (i) tra-im na help-im mi.
 He PRED try-TRANS and help-TRANS me
 'He tries/tried to help me.'

Even within the subordination stage, one finds a variety of clausal subordination types, with differing degrees of cohesion between clauses. These types of clausal subordination range from those that involve most syntactic structure, finite subordination with a CP (Complementizer Phrase) (81–82), to those which involve the least structure, a small clause (83–84), abstracting away from intermediate cases, such as infinitive clauses (see Progovac 2009c, 2010a).

- (81) Mary believes [that he fell off his motorcycle].
 (82) Mary believes [that John knows [that the neighbors noticed [that he fell off his motorcycle]]].
 (83) Let [it rain].
 Peter saw [Mike fall].
 I consider [the problem solved].
 (84) ?I will let [John imagine [Peter see [Mike fall off his motorcycle]]].

In contrast to finite (CP) subordination, which is fully recursive in the sense that one clause can be embedded inside another, potentially *ad infinitum* (82), small clause recursion seems to be somewhat more limited in this sense, as the marginal status of (84) suggests. Of note is that the subjects of embedded SCs have a structural (case) relationship with the matrix verb, the so-called ECM case, suggested by the required adjacency with the verb (no intervening adverbials) (85), and by the required determiner (86).³⁰

³⁰ The label ECM (Exceptional Case Marking) is due to the observation that the verb here assigns structural case to a noun phrase which is not its object. Structural case is a grammatical case assigned to a

- (85) * Peter saw yesterday [Mike fall].
*I consider crucially [the problem solved].
- (86) I consider [* (the) problem solved].
I consider [* (the) class in session].

Both types of embedding exploit some functional glue to “cement” the relationship between the two clauses: complementizers/subordinators (82) or structural case (84). Complementizer glue is more specialized (only used for finite subordination), while structural case is used for other purposes as well. This may be *one* reason why recursion is freer with finite subordination (see also Deutscher 2000). In other words, it may be that finite subordination allows recursion more freely because it is more unambiguously marked for embedding than are ECM small clauses (see also discussion in Section 4.4.2).

Thus, it seems that recursion itself is not an all-or-nothing phenomenon. Very roughly speaking, extrapolating from the discussion in this section, as well as previous chapters, recursion is structurally impossible without hierarchical functional structure; it can be limitless with highly specialized functional categories such as finite complementizers; and it is possible, although not limitless, with other types of structures, such as ECM.

The conclusion emerges that recursion is not just a ubiquitous omnipresent phenomenon, which comes to language free with Merge, but rather it is a consequence of fairly elaborate syntactic structure, which may be present in some, but not other, language constructions. As pointed out in the previous sections, the absence of recursion with a particular structure in a particular language is not an indicator of a general cognitive (in)ability, but rather just an indicator of the less elaborated syntax.

Finally, the functional category stage introduced in this section may have witnessed more fine-grained sub-stages. Perhaps there was a stage in which aspect was grammaticalized, but not yet tense (see also the discussion of PIE in the following section; also Progovac 2008a,b for Serbian small clauses). Perhaps there was a stage in which TP could be built, but not yet CP (see also Chapters 3 and 7 for the vP projection and transitivity). Perhaps gender/number agreement (e.g. on participles) emerged before person agreement (see Progovac 2008a,b). In this respect, Boeckx (2008: 119) suggests that the Minimalist operation Agree may have emerged after Merge. But my primary focus in this chapter is on the three rough syntactic stages, as well as on envisioning what proto-grammars looked like in the initial stages, as well as how these initial stages may have penetrated into the subsequent stages gradually

noun phrase (or DP) by e.g. a verb or a preposition in a certain syntactic configuration, often requiring adjacency. DP is considered to be required for structural case in e.g. English and Italian (Longobardi 1994; see also Chapter 2), which helps explain why the articles are obligatory in (86). For an elaborate argument with regard to small clauses in this respect, see Progovac (2006).

paving the way toward layered/hierarchical and recursive syntax. My purpose was also to show how postulating these stages can shed light on the quirks and complexities of present-day syntax (see also Chapter 5 on Subjacency).

4.5 Corroborating evidence

4.5.1 *Corroborating evidence for the paratactic stage*

There is abundance of corroborating evidence for a paratactic stage in the evolution of human language, coming from e.g. ancient languages (4.5.1.1), grammaticalization processes (4.5.1.2), animal communication (4.5.1.3), agrammatism (4.5.1.4), neuroscience (4.5.1.5), and language acquisition (4.5.1.6).

4.5.1.1 Ancient languages While ancient languages are typically considered to be full modern languages in the sense of language evolution, I consider them separately here first because they are no longer spoken, and second because they just might have preserved more syntactic fossils than present-day languages. Here I merely list some of these fossil properties reported in the literature, leaving their evolutionary significance for future research.

Kiparsky (1968) has argued convincingly that PIE syntax was characterized by optional adverbial temporal particles, which did not build TPs. Such adverbs may have been attached by Conjoin (or Adjoin). Similarly, when it comes to clause combination in PIE, according to Kiparsky (1995: 155) (see also Hale 1987; Watkins 1976; Hock 1989), a major characteristic, best preserved in Sanskrit, Hittite, and Old Latin, was that finite “subordinate” clauses were not embedded but adjoined. Kiparsky further argues that IE protolanguage lacked the category of complementizer and had no CP or any syntactically embedded sentences. What looked like finite subordinate clauses, including relative clauses and sentential complements, were syntactically adjoined to the main clause, still exhibiting main clause properties, such as topicalization of constituents to clause-initial position. Kiparsky (1995: 145) calls these adjoined finite clauses “embedded root clauses,” for they exhibit properties of root clauses, and yet seem to be interpreted as embedded. According to Kiparsky’s analysis, these correspond to the paratactic attachment, which does not yield recursion.

Kiparsky further claims that the introduction of complementizers coincided with the shift from adjunction to subordination, which is in line with Kayne’s (1982) claim that only CPs can function as true sentential arguments, i.e. as embedded clauses (see also Holmberg 1986; Taraldsen 1986). If true, then ancient languages, such as PIE, as well as Akkadian, as discussed in the previous section, can provide additional access to evolutionary fossils of language.

*4.5.1.2 Grammaticalization*³¹ As already pointed out, the outlined progression of stages is consistent with the grammaticalization processes observed in recent times:

³¹ Section 7.3.5 discusses why historical change may be of interest to evolutionary considerations.

e.g. transitions from paratactic to subordinate relationships are observed even in present-day languages. According to e.g. Deutscher (2000) and Traugott and Heine (1991), the grammaticalization of finite subordination typically takes parataxis as a starting point. Mithun (2010) offers several examples from a variety of languages, illustrating the “fluidity” of recursion, in the sense that not all languages exhibit it in all possible constructions. Her findings support the idea that subordination often arises from parataxis, and that parataxis is still used in some languages as the main strategy for clause combination, utilizing intonation as the primary glue. The following example from Mohawk illustrates two independent clauses used in a sequence, but pronounced “as a single intonational contour, beginning with a high pitch reset and descending to a final fall only at the end of the second clause” (Mithun 2010: 24).³²

- (87) Iah ki' the': tehoterìen:tare' na'a:wen'ne'.
 not in.fact at.all did he know (it) so it happened
 ‘In fact, he did not know it. It so happened.’

In English, a preferred way to express this would be by using subordination, as in (88) below. But the use of parataxis in English is still widely attested, as the example in (89) shows.

- (88) In fact, he did not know [what happened].
 (89) You know that. Marc is a linguist.

Such paratactic combinations of independent sentences into a single intonation unit often result in the grammaticalization of demonstratives into complementizers. All that needs to happen in (89) is for the demonstrative *that* to be reanalyzed as introducing the following clause (90), rather than ending the previous clause, and this is in fact a very frequent source of complementizers/subordinators, according to e.g. Heine and Kuteva (2007) and references there:

- (90) You know [that Marc is a linguist].

If this kind of progression from parataxis to subordination is a natural process that occurs even in present times, then this is certainly not an implausible scenario for the evolution of human language.

4.5.1.3 Comparative studies: Animal communication Given that parataxis involves no markers of Merge other than intonation/prosody, it is also of interest here that

³² It is in fact a traditional view in historical linguistics that subordination (hypotaxis) develops from parataxis (juxtaposition, coordination), advocated in e.g. Schlegel (1808), Bauer (1833), Delbrück (1893–1900), among many others (see e.g. Harris and Campbell 1995 for criticism of this view, as well as for many additional references). Harris and Campbell conclude, however, that subordinate clauses originated in relatively recent times (308).

intonation and prosody, which are modulated analogically, rather than discretely, have been proposed by many to have been available before syntax proper, given that they seem to have analogs in other species (see e.g. Deacon 1997; Piattelli-Palmarini and Uriagereka 2004; Burling 2005), and given that prosody emerges early in language acquisition (Section 4.5.1.6)³³ According to Deacon (1997), speech prosody is essentially a mode of communication that provides a parallel channel to speech; it is recruited from ancestral call functions.³⁴ Like these systems, prosodic features are primarily produced by the larynx and lungs, and not articulated by the mouth and tongue. But unlike calls of other species, prosodic vocal modification is continuous and highly correlated with the speech process (Deacon 1997: 418).³⁵ The human larynx must be controlled from higher brain systems involved in skeletal muscle control, not just visceral control (243).

According to Deacon, it is as though we have not so much shifted control from visceral to voluntary means but superimposed intentional cortical motor behaviors over autonomous subcortical vocal behaviors. If this is on the right track, then this would be another scenario consistent with the theme of this monograph, which is that older strategies got integrated into more recent ones, rather than got replaced by them, resulting in composite structures.

There have also been numerous reports that primates can combine two signs into a meaningful utterance, even though, as pointed out by reviewers, the interpretations of these findings are controversial. The problem seems to be that primates usually produce a stream of signs without much evidence for cohesion (e.g. Kanzi, a bonobo, as reported in Savage-Rumbaugh and Lewin 1994). The question then is whether there are at least some sporadic attempts to put some of these signs together into meaningful units. It has been reported that Washoe, a chimpanzee who learned how to use signs of American Sign Language, combined the signs for water and bird to describe a duck (Gardner, Gardner, and van Cantfort 1989). Kanzi has been reported to be able to combine a lexigram and a gesture into a meaningful unit (Greenfield and Savage-Rumbaugh 1990: 161), as discussed in Section 3.5.

Washoe's and Kanzi's ability to combine two elements into a meaningful unit should not be taken to mean that they are using compounds or small clauses in the same productive way that humans do today. Clearly, the use of such combinations by non-humans is rare and sporadic. The relevant question here is not whether Washoe reached a two-word or hierarchical stage of language, but rather whether our

³³ In addition, intonation and prosody may remain intact even in cases of various kinds of aphasia (e.g. Brain and Bannister 1992; Pulvermüller 2002; and references cited there).

³⁴ Affective prosody has been reported to be strikingly similar in humans and other primates so that human subjects having no previous experience with monkeys correctly identify the emotional content of their screams (Linnankoski *et al.* 1994; Kotchoubey 2005: 136; see also Hurford 2007: 282).

³⁵ This is also consistent with Tyler and Warren's (1987) experimental finding that comprehension is affected by disrupting either syntactic or prosodic structure (Section 4.1).

common ancestors were in principle capable of combining two signs. This kind of basic ability, if it was there at the relevant juncture, would have greatly facilitated the transition from the one-word stage to the two-word stage. In order for the selection process to get off the ground, at least some of our common ancestors should have been capable of producing and understanding such combinations. Those who were just a bit better at it would have been the ones whose genes were passed on in the line of descent leading to humans. It is important to point out that any continuity with other primates is not to be sought in the most advanced features of human syntax, such as recursive CPs or DPs, but rather in the most rudimentary of syntactic structures, such as two-word paratactic combinations.

One important consequence of the syntactic reconstruction offered in this book is that it decomposes syntax down to its most modest beginnings, revealing where continuity with the abilities of non-humans is likely to be found. In this respect, consider Yang's (2013) study discussed in Section 2.5.1. It compares children's combinations of articles (*a* and *the*) and nouns, with the sign combinations by non-human primates, of the kind *give X*, or *more X*. It is not clear to me how these structures are comparable, given that articles are highly abstract functional categories (associated with DPs), late to emerge in children (e.g. Radford 1990), as well as in the grammaticalization processes (e.g. Heine and Kuteva 2007). Recall also from Section 4.4.3 that articles are not even available in all human languages. In any event, this monograph suggests that continuity can only be expected with the most rudimentary of syntactic structures. But even there, as pointed out above, one does not expect human-like fluency with two-word combinations—not at all. After all, humans had millions of years to undergo selection for language since the common ancestor with chimpanzees. All one can hope to find in this respect is a precursor to the ability to combine signs.

4.5.1.4 Agrammatism As discussed in Chapter 2, agrammatism offers another source of corroborating evidence for small clause grammars, which are arguably paratactic grammars. Consistent with the conclusion that agrammatic patients often resort to small clause grammars, one expects them also to have difficulties with embedding and recursion.

As found in e.g. Friedmann and Grodzinsky (1997), the use of subordination/CP is also affected in the speech production of agrammatic aphasia, which typically involves a lesion in the left inferior frontal gyrus (see also Friedmann 2002). While the speakers in their study could produce simple sentences, they failed to produce embedded sentences in sentence repetition and sentence elicitation tasks, as well as in spontaneous speech. The study concludes that these agrammatics cannot project their syntactic trees up to the CP node (their Tree-Pruning Hypothesis). This is expected if agrammatics often resort to paratactic small clause grammars, with as few functional projections as possible.

In addition, a recent neuroimaging study found that sentences with CPs involve more activation in multiple loci, including Broca's area, in comparison to those without a CP (Shetreet, Friedmann, and Hadar 2009). The authors concluded that the generation of syntactic layers is cognitively costly, which is fully compatible with the proposal explored in this monograph.

4.5.1.5 Neuroscience Recent computational and brain-imaging work is consistent with the notions explored in this book. To take one example, a PET study by Indefrey, Brown *et al.* (2001) indicates that non-finite clauses do indeed require less grammatical work. These authors presented German-speaking participants with pictures of simple colored objects (squares, circles, and ellipses) in different spatial configurations. The task of the participants was to describe the pictures, using one of three different sentence formats. In the full-sentence condition, they had to produce a full grammatical sentence, containing all relevant information (e.g. *Das rote Viereck stößt die blaue Ellipse weg* 'the red square pushes the blue ellipse away'). In the noun phrase condition, they were required to use a non-finite phrase and to leave out the determiner (e.g. *Rotes Viereck, blaue Ellipse, wegstoßen* 'red square, blue ellipse, pushing away'). In the word condition, participants were also required to produce sub-sentential forms, but this time they needed to omit the inflection of the adjective and put the adjective after the noun (e.g. *Viereck rot, Ellipse blau, wegstoßen* 'square red, ellipse blue, pushing away'). The latter two strategies involve paratactic attachment, and not fully integrated syntax. The blood flow response varied as expected between these conditions in the left operculum, a region just behind Broca's area: maximal response in the full-sentence condition, less strong in the noun phrase condition, and less strong still in the word condition.

It is also of some interest that the data introduced in this monograph, the "living fossils" of the paratactic stage, are characteristically formulaic/stereotypical expressions (e.g. *Case closed; Me first; Nothing ventured, nothing gained*). According to e.g. Code (2005: 317), non-propositional, stereotypical/formulaic uses of language might represent fossilized clues to the evolutionary origins of human communication, given that their processing involves more ancient processing patterns, including more involvement of the basal ganglia, thalamus, limbic structures, and the right hemisphere (see e.g. Lieberman 2000 for an extensive argument that subcortical structures, basal ganglia in particular, play a crucial role in syntax). According to Ullman (2006: 480–1), Broca's area is part of a larger circuit that involves the basal ganglia, with the two parts of the brain densely interconnected. Basal-limbic structures are phylogenetically old and the aspects of human communication associated with them are considered to be ancient too (van Lancker and Cummings 1999; Bradshaw 2001). The Appendix returns to this discussion.

Moreover, the proposals in this monograph are vulnerable to empirical verification. Neuroimaging experiments can be devised in such a way as to distinguish

between paratactic (small clause) structures and hierarchical structures, as explored in the Appendix (see also Chapter 2).

4.5.1.6 Acquisition As discussed in Chapter 2, syntax in language acquisition seems to begin with a root small clause stage (or root infinitive stage), arguably a two-word paratactic stage. Early stages of second language acquisition have been analyzed in a similar fashion (see e.g. Klein and Purdue's 1997 Basic Variety). Also, as shown in e.g. Hua and Dodd (2000), prosody emerges early in language acquisition. On the other hand, subordination, as well as Move, are rather late developments in children, as reported in numerous references (e.g. Radford 1990; Lebeaux 1989; Ouhalla 1991; Platzak 1990; Potts and Roeper 2006; Hollebrandse and Roeper 2007). This is consistent with the claim in this monograph that subordination and Move are unavailable in the paratactic stage.

4.5.2 Corroborating evidence for a proto-coordination stage

Evidence for a proto-coordination stage is not nearly as robust as evidence for a paratactic stage. It is entirely possible that the proto-coordination stage was a brief stage, which quickly led to grammaticalization of specific functional categories. This stage also must have been optional in the sense that not all languages/constructions had to pass through it. Recall from Section 4.5.1.2 that subordinators often grammaticalize from demonstratives and verbs like *say*, rather than from pure linkers (see e.g. Heine and Kuteva 2007). The coordination stage may have been only a detour, a direction taken only in some circumstances.

One piece of corroborating evidence for a coordination stage may come from instances where grammaticalization of e.g. finite subordination proceeds through a (n intermediate) coordination stage (see e.g. Deutscher 2000; Traugott and Heine 1991; and references cited there). While the references above often speak of coordination even where there is no overt coordinator, there are some concrete proposals according to which an overt coordinator grammaticalizes into a subordinator.³⁶ For example, according to Harris and Campbell (1995: 290), conditional marker *da* in Mingrelian, language spoken in Western Georgia, comes from the conjunction *and*.

Likewise, it is frequently reported in language acquisition literature that some children use "fillers" in places where one would expect functional categories. While researchers sometimes attribute the presence of such fillers to the presence of specific functional categories, a more conservative approach is that these are just connectors (proto-conjunctions or linkers), serving to connect words into phrases/clauses (see e.g. Peters 1999; Peters and Menn 1993; Veneziano and Sinclair 2000; and references

³⁶ As discussed in detail in this chapter, various languages and constructions do not mark with conjunctions what can be considered as coordination, resulting in structures which straddle the boundary between parataxis/adjunction and coordination.

cited there). Such fillers in English are often a syllabic nasal [m] or a schwa [ə], as the following example illustrates (Peters and Menn 1993):

(91) [m] pick [ə] flowers. (English learning boy, age 1;6)

According to the above authors, the fillers are vocalizations that do not correspond to particular words/morphemes, and that initially seem to range over various kinds of functional categories/positions.

Such fillers can thus be seen as proto-conjunctions, as per the proposal in this chapter. It is only later that they transition into specific functional categories, resulting in hierarchical structure. If this is on the right track, it can be seen as a progression from a proto-coordination stage to a specific functional category stage.

In addition, Pérez-Leroux *et al.* (2012) found that young children in their study frequently avoided producing recursive nominals with three nouns, such as *Elmo's sister's ball*, which crucially rely on recursive hierarchical structure, and possibly on the presence of a DP (Determiner Phrase) projection (see Section 4.4). In contrast, the same children demonstrated facility integrating three nouns into coordinated structures, suggesting that coordination involves less syntactic complexity than embedded recursion, consistent with the proposal in this chapter (see especially Section 4.4 for the distinction between true recursion and iteration, as per Kinsella 2009).

Also, Jordens (2002) argues that there is a stage in the acquisition of Dutch where all constituents are attached by adjunction/parataxis, but where certain modal verbs and negation serve as proto-functional categories. These proto-functional categories, according to Jordens, are linking elements between the topic and the predicate (744), certainly analyzable as proto-conjunctions/linkers in the sense of this chapter. In the next, “finite-linking stage,” these linkers are grammaticalized into auxiliaries, which now serve as heads of hierarchical structures (750). This progression of stages fits well with the proposal of this chapter, showing transitions from the adjunction/parataxis stage to the proto-coordination and the specific functional category stages.

4.6 Concluding remarks

This chapter has proposed the following progression of syntactic stages in the evolution of human language:

o. One-word stage (non-syntactic stage)

(i) *Paratactic proto-syntax stage* (flat, non-hierarchical stage), where prosody/suprasegmentals provide the only glue for (proto-)Merge (Conjoin)

(ii) *Proto-coordination stage*, where, in addition to prosody, the (proto-)conjunction/linker provides all-purpose *segmental* glue to hold the utterance together. It is only at this stage that Move and recursion become available

(iii) *Specific functional category stage (hierarchical stage)*, where, in addition to prosody and to segmental glue, specific functional categories also provide specialized syntactic glue for constituent cohesion, including tense elements and subordinators/complementizers.

The progression of stages along these lines is being proposed both for predication (clause-internally) and for clause combination. It is shown that each new stage offers clear and concrete communicative advantages over the previous stage(s), and moreover advantages specific enough to be responsive to natural selection. Significantly, in their modern incarnations, the constructions of the three stages also overlap a great deal, which is expected under a gradualist evolutionary scenario.

In Chapters 2 and 3 I argued that the capacity for two-word paratactic grammars evolved due to natural selection, including sexual selection. As the reviewers point out, the question now arises whether the capacity for hierarchical syntax evolved through biological selection as well, or whether it just developed through the grammaticalization processes, once the paratactic stage was in place. My hypothesis here is that the capacity to use hierarchical grammars evolved through biological processes as well, although I am certainly not claiming that each specific functional projection had to evolve that way. This will be further discussed in Chapter 7.

The following chapter on Subjacency builds directly on the proposals in this chapter to explain why adjuncts and conjuncts constitute islands for Move.

Islandhood (Subjacency) as an epiphenomenon of evolutionary tinkering

5.1 Introductory note

This chapter builds directly on Chapter 4 in that it proposes to treat islandhood/Subjacency as an epiphenomenon of the progression through the three evolutionary stages, as outlined in that chapter. In particular, the proposal of the previous chapter is that adjunction/parataxis and proto-coordination stages of syntax do not show full syntactic integration and thus do not allow movement or subordination. This approach not only directly captures the islandhood of adjunction and coordination, but it can also shed light on some other island effects. In this view, Subjacency or islandhood can be seen as the default, primary state of language, due to an evolutionary base of language which was without Move. This default state can be overridden in certain evolutionarily novel, fancy constructions, arising in the hierarchical (subordination) stage(s). The constructions that allow Move form a natural class, and can be characterized syntactically, while the constructions that do not allow Move (islands) do not form a natural class at all. My conclusion is that Subjacency is not a principle of syntax, but rather an epiphenomenon of the evolutionary trajectory of syntax.

5.2 What is islandhood/subjacency?

Move(ment) plays a central role in Minimalism (e.g. Chomsky 1995) and its predecessors. So, for example, *wh*-question formation in English is considered to involve movement of the *wh*-word or phrase from its thematic (underlying) position to the left periphery of the sentence. The following examples illustrate this:

- (1) What do penguins eat **what**?
- (2) What does Peter think [_{CP} penguins eat **what**]?

- (3) Who(m) did Peter walk with ~~who(m)~~?
 (4) Who(m) did you say [_{CP} Peter walked with ~~who(m)~~]?
 (5) What did Peter eat ham with ~~what~~?
 (6) *What did Peter eat ham and ~~what~~?
 (7) Who did Peter see Richard with ~~who(m)~~?
 (8) *Who did Peter see Richard and ~~who(m)~~?

In (1)–(2) it is assumed that the *wh*-word *what* originates after *eat* as a complement/object of *eat* (cf. echo questions such as *Penguins eat what?*), and that it subsequently moves to the front of the sentence, to the position of the specifier of CP. (The *wh*-word.) Similar considerations hold of the *wh*-word *who(m)* in the examples (3)–(4). It is important to note here that *wh*-movement conceived in this way can cross clausal (CP) boundaries, as is the case in (2) and (4).

In his seminal work, Ross (1967) noted that there are many types of syntactic islands, that is, constructions out of which it is not possible to apply Move.¹ One such island is coordination—as illustrated with the minimal pairs below, while it is possible to move a *wh*-word out of a Prepositional Phrase (PP) (5, 7), it is not possible to move a *wh*-word out of a conjunct (6, 8):

- (5) What did Peter eat ham with ~~what~~?
 (6) *What did Peter eat ham and ~~what~~?
 (7) Who did Peter see Richard with ~~who(m)~~?
 (8) *Who did Peter see Richard and ~~who(m)~~?

Notice that the echo versions below are grammatical, suggesting that the problem lies with the movement itself, rather than with the semantics.

- (9) Peter ate ham and what?
 (10) Peter saw Richard and ~~who(m)~~?

Movement is also prohibited out of adjunct clauses, which are also considered to be islands:²

- (11) ?*What did Peter retire [_{CP} after Mary said ~~what~~?]
 [cf. echo question: Peter retired after Mary said what?]

Likewise, movement out of subjects (12) is less acceptable than movement out of objects (13), and subjects are for that reason also regarded as islands:

¹ “We say that a phrase is an ‘island’ if it is immune to the application of rules that relate its parts to a position outside of the island” (Chomsky 1980: 194).

² As pointed out by a reviewer, there are some apparent exceptions to this observation in certain well-defined contexts, as reported in Borgonovo and Neelman (2000: 199–200):

- (i) What did John arrive whistling ~~what~~?

- (12) ??Who did [_{NP} your loyalty to ~~who(m)~~] appeal to Mary?
[cf. echo question: Your loyalty to who(m) appealed to Mary?]
- (13) Who(m) did Bill question [_{NP} your loyalty to ~~who(m)~~]?
[cf. echo question: Bill questioned your loyalty to who(m)?]

The following examples introduce two additional islands: *Wh*-Islands, where *wh*-extraction is prohibited out of another *wh*-clause (14), and Complex NP Islands, where Move is prohibited out of a noun phrase which includes a clause, either a nominal complement clause (15), or a relative clause (16):

- (14) ²*Which book did you ask John [_{CP} where Bill bought ~~which~~-
book]?
- (15) *What did Bill reject [_{NP} the accusation [_{CP} that John stole ~~what~~]]?
- (16) *Which book did Bill visit [_{NP} the store [_{CP} that had ~~which~~-book in
stock]]?

Interestingly, there are languages (e.g. Japanese and Chinese) which keep their *wh*-phrases *in situ* (i.e., not moved), and it is still an open theoretical question how to analyze *wh*-questions in these languages. One line of research considers that *wh*-words in fact do undergo Move even in these languages, but covertly/invisibly so (e.g. Huang 1982). However, just as is the case with English echo questions (9–10), *wh*-words *in situ* in these languages do not show island effects, at least not when in argument positions. This prompted e.g. Huang (1982) to propose that Subjacency does not hold for covert *wh*-movement. In contrast, Tsai (1994) and Hagstrom (1998) rejected the idea that *wh*-words themselves move covertly, but instead proposed a different strategy of deriving such *wh*-questions. According to the proposal in Fukui (1986), the lack of *wh*-movement in Japanese can be correlated with the lack of CP in the language.

While it is beyond the scope of this book to engage with the issue of covert movement, suffice it to say here that approaches which do not invoke such movement of *wh*-phrases are fully compatible with the evolutionary approach I am adopting here. This is so because these approaches identify a different strategy for expressing *wh*-questions, a strategy which does not require a CP layer, or Move.³ The approach explored here highlights the existence of multiple routes to the same goal.

One of the central goals of syntactic theory has been to determine what differentiates constructions that allow Move from those that do not. Overwhelmingly, the assumption among syntacticians is that islandhood, that is, restrictions on Move, is the marked case, in need of explanation. This assumption has led to the expectation that there is some (abstract) principle of syntax, such as Subjacency, which accounts

³ As proposed in Radford (1990), a similar kind of strategy is needed to capture *wh*-questions in child English, prior to the emergence of CP.

for all or most of the island effects. Research has thus concentrated on characterizing and defining the principles that are taken to constrain Move, including Subjacency.⁴ Almost fifty years after Ross' dissertation, no real progress has been made on this front—there is still no principled characterization of islandhood.⁵

Most accounts stipulate which syntactic nodes (S, NP, CP, DP, etc.), and/or which combination of nodes, and/or nodes in which syntactic positions, constitute obstacles to Move (barriers/bounding nodes/phases). The classic accounts are Huang (1982); Lasnik and Saito (1984); and Chomsky (1986). To take one example, very roughly speaking, one can account for the Complex NP constraint (15)–(16) by assuming that the NP is an obstacle to Move, to use neutral terminology. But the NP proves an obstacle only in conjunction with a clause, given that movement is otherwise possible either out of a clause as in (2) and (4), or out of an NP as in (13). Very roughly speaking again, one needs to assume that clauses and NPs are both obstacles, but that the *wh*-phrase can jump over one obstacle (at a time), even though not over two. So far, so good. But then this analysis does not really carry over to other islands. When it comes to the Subject Island, how does one explain why movement out of the subject NP is illicit, while movement out of a comparable object NP is licit? In both cases, the *wh*-phrases seem to be crossing the same number of obstacles. According to Huang (1982), this is because the subjects (and adjuncts) are not “properly governed,” while objects are. In Chomsky's (1986) version, this is because subjects (and adjuncts) are not L-marked, while objects are. The appeal to either proper government or L-marking only stipulates that objects/complements are special/privileged in this respect, implicating the importance of the structural position, in addition to the nature and number of nodes crossed. But there is now no real unification of the Complex NP Island, on the one hand, and subject or adjunct islands, on the other.⁶

⁴ Some more recent accounts (e.g. Boeckx 2008) adopt a pluralistic view of islandhood, that is, a view that islandhood is a result of the application of various principles, not just one unified principle such as Subjacency. Under this view, a unification of all islandhood is not pursued or expected. In fact, Boeckx considers that the result of each Merge is an island, although typically not an absolute island. For him, islandhood results if too much checking affects a single item. If features to be checked can be distributed over more than one item, such as may be the case with movement leaving a resumptive pronoun, then islandhood is voided or weakened (208). In other words, the islands are relativized to the amount of checking relations established and their configurations. Boeckx (2008) does acknowledge, however, that adjoined structures “have a freezing effect” on movement (233), as well as that the islandhood of coordination is not captured by his, or any other syntactic theory (237).

⁵ This is not meant, in any way, to denigrate the quality of research done within this approach. For even when one follows an ill-fated hypothesis, one gathers invaluable data and insights along the way. But however fine and ingenious this research may have been otherwise, and however great its contributions, in my view, it has not yielded progress on this particular front, that is, it has not provided a principled account of islandhood, suggesting that a different angle is needed.

⁶ And this is looking at islandhood in only one language: English. There is variation in this respect across languages, too (see e.g. Sprouse and Hornstein 2014: 4). To take just one example, Italian does not seem to show *wh*-island effects. To account for this, Rizzi (1982) proposed that in Italian the obstacles for movement are NPs and CPs, as opposed to NPs and IPs (i.e. TPs) in English. Also, as mentioned above, in

And the problems multiply as one considers additional islands, such as coordination (see e.g. Postal 1997, 1998).⁷

Within the Minimalist Program, in which proper government and L-marking of the previous frameworks are not available as theoretical postulates, Chomsky (2001, 2008) attempts to capture some of the island effects by invoking new Minimalist constructs, phases (impenetrable domains), again stipulating that CPs and DPs (former NPs) are phases. As Boeckx and Grohmann (2007: 216) observe, these most recent phase-based approaches to islandhood do not improve upon the previous approaches, and “phases are in many ways reincarnations of bounding nodes and barriers.” Belletti and Rizzi (2000) report an interview with Chomsky, in which he concludes that “there is no really principled account of many island conditions.”

5.3 Why there is no principled account of islandhood

The persistent view of islandhood/Subjacency (in Minimalism and predecessors) considers Move to be the default option, while Subjacency (and other restrictions on Move) are treated as a marked option, in need of explanation (Ross 1967; Huang 1982; Lasnik and Saito 1984; Chomsky 1986, 2001; Stepanov 2007; Sprouse and Hornstein 2014). To be more accurate, Move in Minimalism is never completely free, as it is taken to apply only if motivated by a need to check certain (strong uninterpretable) features. But once such features are present in the derivation, it is considered that Move applies freely, in the sense that it applies unless blocked by some specific principle like Subjacency.

Significantly, this view fuels the influential language evolution hypothesis, according to which Merge (which subsumes Move) was the only evolutionary breakthrough for syntax: once it emerged, it was able to apply freely and recursively, automatically yielding Move and subordination (Berwick 1998; Chomsky 2005; Berwick and Chomsky 2011). In an early attempt to reconcile this view with a gradualist approach to syntax, Newmeyer (1991) proposes that a grammar with Subjacency was specifically targeted by natural/sexual selection, over a previous stage of grammar, which presumably had no Subjacency. This implies that this previous stage was characterized by a much freer Move, and that the ungrammatical examples discussed in Section 5.2 would have been grammatical in this stage. However, Lightfoot (1991: 69)

some languages *wh*-phrases do not show overt movement at all, and this introduces further complications for the characterization of Subjacency.

⁷ In fact, coordination and adjunction seem to be the most difficult islands to capture. For example, Napoli (1993: 401, 409) notes that “while Subjacency accounts for the Complex NP Constraint, [...] the Subject Condition, and the *wh*-islands, it cannot account for the ungrammaticality of movement out of coordinate structures and out of adverbial clauses” (see also Footnote 4). The islandhood of coordination and adjunction is the central focus of this chapter, and it is proposed here that it follows from a looser integration of adjuncts and conjuncts into the fabric of syntactic structure (see Chapter 4).

counters that “Subjacency has many virtues, but [...] it could not have increased the chances of having fruitful sex.” In other words, it is not clear how or why a grammar with Subjacency would have been naturally/sexually selected over a grammar without Subjacency.

It is exactly based on these considerations that Berwick (1998: 338–9) concluded that “there is no possibility of an ‘intermediate’ *syntax* between a non-combinatorial one and full natural language—one either has Merge in all its generative glory, or one has no combinatorial syntax at all” (see also Bickerton 1990, 1998, 2007; Berwick and Chomsky 2011; Chapter 1). This reasoning, which is reminiscent of the old saw “what use is half an eye,” has led some syntacticians to believe that syntax is an all-or-nothing package, which could not have evolved gradually, and which must have been, in its entirety, a product of one single sudden event, possibly one single mutation, which Berwick and Chomsky (2011: 29) characterize as “minor.”

But there is no need for this drastic conclusion. In fact, there is an alternative possibility to consider regarding Subjacency (mentioned in e.g. Cinque 1978; Postal 1997; Boeckx and Grohmann 2007; Progovac 2009b), that islandhood is the default state of syntax. Given this view, permitting Move would be a special/marked option. In fact, the constructions that prohibit Move are much more numerous and diverse than those that allow it. Consider, again, the list of constructions which constitute islands (for a long inventory of additional island constructions, see e.g. Postal 1997, 1998):

Subject Islands

- (17) ??Who did [_{NP} your loyalty to ~~wh_θ~~] appeal to Mary?

Wh-Islands

- (18) ?*Which book did you ask John [_{CP} where Bill bought ~~which-book~~]?

Complex NP Islands

- (19) *What did Bill reject [_{NP} the accusation [_{CP} that John stole ~~what~~]]?
 (20) *Which book did Bill visit [_{NP} the store [_{CP} that had ~~which book~~ in stock]]?

Adjunct Islands

- (21) ?*What did Peter retire [_{CP} after Mary said ~~what~~?]

Conjunct Islands

- (22) *What did Peter retire and [_{CP} Mary said ~~what~~?]

Typically, Move is possible only out of (a subset of) complements/objects, for example, verbal (non-*wh*-)complements, whether clausal (23) or nominal (24):

(23) Which book did you tell John [_{CP} that Bill bought ~~which book~~]?

(24) Who did Bill question [_{NP} your loyalty to ~~who~~]?

What this means is that constructions which disallow Move (islands) do not form a natural class, while those that allow Move, seem to. If so, then any attempt to characterize islandhood/Subjacency in unified terms is doomed to fail. On the other hand, it should be possible to formulate a general characterization of non-island constituents, as pointed out in Postal (1997). For example, in the case of (23–24), Move proceeds through the hierarchy of projections where each new layer *c*-commands the previous one, and where there are no adjunct or conjunct clause boundaries on the way. Recall from Chapter 4 that *c*-command does not extend seamlessly into adjuncts or conjuncts, and given that movement has to proceed to a *c*-commanding position, any boundary that is not strictly hierarchical, subject to an unbroken chain of *c*-command, can trip up Move.

Furthermore, there are additional cases where Move is illicit, and I list them here to anticipate the discussion in subsequent sections. For example, Move does not occur across sentential boundaries, as is well-known, but not discussed in the context of Subjacency:

(25) *Who did Mary see the movie. It featured ~~who~~?

The idea is that the principles of syntax do not extend across sentence boundaries, but it is worth noting here that some sentence-internal boundaries, such as parataxis, resemble sentential boundaries in this and other respects.

Move is also prohibited from paratactically (loosely) attached parallel small clauses (26), as well as from small clauses adjoined to finite clauses (27), the latter example, but not the former, subsumable under Adjunct Islandhood:⁸

(26) a. *What nothing ventured, ~~what~~ gained?
(cf Nothing ventured, nothing gained.)

b. *How easy come, ~~how~~ go?
(cf Easy come, easy go.)

c. *Who monkey see, ~~who~~ do?
(cf Monkey see, monkey do.)

(27) *Where can her having retired from ~~where~~, we finally relax?
(cf. Her having retired from where, we can finally relax.)

Both types of examples above feature a paratactic boundary across which the *wh*-phrase would have to Move. If the paratactic glue is mainly intonational/prosodic

⁸ As pointed out by the reviewers, these examples do not seem to allow even echo questions:

- (i) ??Nothing ventured, what gained?
- (ii) *Easy come, how go?

(Chapter 4), then the paratactic boundary is not unlike a sentence boundary. In addition, if these are just small clauses, then they are not provided with the functional categories and projections, such as CP, that would provide the landing sites for *wh*-Move. It is typically considered that *wh*-movement targets the specifier position of CP, and that if this position is not there, or is filled with some other material, *wh*-movement cannot take place (see also Section 4.4.5).

The same considerations hold for single root small clauses in (28) below, discussed in chapters 2 and 3. If these clauses are just bare argument-predicate concatenations, then they also lack the relevant syntactic space for Move to take place, such as TP or CP.

- (28) *When problem solved ~~when~~? (cf. Problem solved.)
 *Who(m) worry? (cf. Jeanne worry?!)

With these additional examples, it becomes even clearer that constructions that prohibit Move (islands) have no syntactic property in common, that is, that these constructions do not form a natural class. It is thus not surprising that in spite of all the effort, to date, there has been no principled analysis of islandhood/Subjacency, as pointed out in Section 5.1 (see also Belletti and Rizzi 2000; Szabolcsi and den Dikken 2003; Boeckx and Grohmann 2007).

As mentioned in Footnote 4, yet another angle is possible, namely, to adopt a pluralistic view in which islandhood is a result of several independent principles that constrain Move (see e.g. Boeckx 2008). In addition to not being able to capture the islandhood of coordination and adjunction, the central topics of this chapter, this view is also not able to account for the generalization that non-islands seem to form a natural class. Even though the correlation is not perfect, it still holds that if a constituent is *not* a complement, then it is highly likely to be an island.⁹

For all these reasons, it would be prudent to explore an alternative track, an approach that takes islandhood to be the default state of syntax, and Move a special option, available only in certain privileged constructions. In this view, the question is no longer why Move is impossible out of islands, but rather why Move is possible out of certain complements, and indeed why Move is possible at all. But, first, before one can pursue that question, it is important to establish the reason why No Move would be the default state of syntax. The next section addresses that question.

⁹ There are many subtleties regarding islandhood, including distinguishing weak from strong islands, which my approach does not address. I hope that future research will address this question within an evolutionary framework, especially given that an evolutionary approach is well-equipped to deal with graded grammaticality. In this respect, one would need to consider the three rough stages explored in this monograph: Adjunction/Parataxis, Coordination, and Subordination, as just three idealized points in the evolution of syntax, with a variety of transitional sub-stages certainly a possibility, as discussed in Chapter 4. To the extent that the structures can be more or less syntactically integrated, the graded judgments would then reflect the extent of that integration, which can vary not only across constructions, but also across languages.

5.4 Subjacency in the light of evolution

My proposal is that proto-syntax, characterized by one-word utterances, (root) small clauses (29), and paratactic combinations of such small clauses (30), did not have Move or subordination (Progovac 2008a,b, 2009b, 2013b, 2014a), as discussed in Chapters 2–4.¹⁰

(29) a. Case closed. Problem solved. Point taken. Crisis averted.

Me first! Everybody out! Him apologize?!

(30) a. Nothing ventured, nothing gained.

b. Easy come, easy go.

c. Monkey see, monkey do.

d. Come one, come all.

The examples above are arguably present-day approximations of this stage of syntax. Even though these present-day incarnations must be a bit more complex than the proto-structures, they still do not allow Move (26–28), as established in the previous sections, as well as in the previous chapters.

In this proposal, the kind of syntax illustrated in (29)–(30) was primary and foundational, while Move was an evolutionary innovation. In agreement with Newmeyer (1991), this proposal advocates a gradualist approach to the evolution of syntax; however, recall that Newmeyer proposed that the previous stage(s) of grammar had no restrictions on Move, and that Subjacency was an innovation (Section 5.2).¹¹ In my proposal, in contrast, the proto-stages of grammar were characterized by islandhood, or lack of Move, with Move emerging only later, in conjunction with layered, hierarchical syntax (Section 4.4.5), supported by specialized functional categories and projections, such as TP and CP. In Minimalism Move is typically associated with functional projections. For example, Move of the underlying small clause subject targets the specifier of a TP (Chapter 2; Section 4.4.5), while *wh*-movement targets the specifier of a CP, as illustrated in this chapter.¹² In a small clause based grammar which has neither TPs nor CPs, one does not expect to encounter this type of Move, especially considering that Move has to target a hierarchically higher position, as explained in Section 4.4.5.

¹⁰ As pointed out by Boeckx (2008), syntactic theories of Subjacency, and locality in general, should be compatible with findings in neuroscience and evolutionary biology: “Up to now, compatibility with neuroscience and evolutionary biology has been a rather weak constraint on theory construction in linguistics” (Boeckx 2008: 4).

¹¹ A similar idea can be found in, for example, Boeckx’s (2008: 244) statement that bounding nodes are solutions that the language faculty has developed to ensure that syntactic objects are unambiguous.

¹² A reviewer wonders if all Move operations target functional projections. I would say here that at least the uncontroversial cases of Move do involve functional projections, such as subject raising to TP, *wh*-raising to CP, V movement to v, etc. In fact, even adjunction of adverbials is sometimes claimed to target only functional projections (see e.g. Adger 2003).

Going back to islands, we can now envision an answer to the question of why some constructions still disallow Move (e.g. coordination and adjunction), while others facilitate it (e.g. subordination). My claim is that our grammars, courtesy of gradual evolutionary development, show a range of constructions that fall between the two opposites: (i) completely independent utterances/sentences and (ii) syntactically fully integrated expressions. The intermediate possibility is to be loosely attached (semi-integrated) into sentential fabric, and this is arguably the case with parataxis/adjunction and conjunction.¹³ Only the most integrated of constructions (e.g. complements), which build a ladder, a scaffolding of functional projections, allow Move to climb along this ladder.¹⁴ The metaphor of climbing is appropriate here given that syntactic theory assumes that movement is always to a structurally higher (c-commanding) position. Clausal conjuncts and adjuncts have been repeatedly noted in the literature not to be fully integrated into syntactic fabric, as discussed in Chapter 4. An evolutionary approach can shed novel light on these phenomena.

This evolutionary account also helps explain why human grammars should avail themselves of redundant means for expressing clause combinations, and moreover such “imperfect” means, as are coordination and adjunction. Recall from Chapter 4 how clauses are combined in the postulated three rough stages: parataxis (adjunction) (31), coordination (32), and subordination (33):

- (31) He is a linguist—(as) you know. *Parataxis*
 (32) He is a linguist, and you know it. *Coordination*
 (33) You know that he is a linguist. *Subordination*

If comparable stages characterized language evolution, with adjunction and coordination constituting intermediate steps between separate utterances (no syntactic integration, no Move) and subordination (full integration, free(er) Move), then such evolutionary “tinkering” left us with multiple possibilities which partly overlap in function, that is, with redundant means for expressing similar meanings (31)–(33).¹⁵

¹³ Even though I will not discuss subject islands in this book, it is worth noting that syntactic theory recognizes that subjects/specifiers are less tightly integrated than objects/complements. While objects/complements are merged directly with the verbs (First Merge), subjects/specifiers are typically introduced as sisters to intermediate projections (Second Merge). In addition, subjects typically undergo local Move out of verbal projections, further contributing to their syntactic instability.

¹⁴ This is not to say that subordination was necessarily one big solid monolithic stage—as pointed out repeatedly in this chapter, as well as in Chapter 4, sub-stages and transitions may well have existed, and may account for a number of present-day constructions which are ambivalent and difficult to categorize.

¹⁵ My claim here is not that a hierarchical stage automatically licenses Move. I am only saying that hierarchy is a necessary condition for Move, not sufficient. This is not surprising given that Move is typically assumed to target a c-commanding position, that is, a structurally higher position. Other conditions clearly need to be met to allow Move, including the existence of the appropriate and available landing sites for Move (e.g. CP for *wh*-movement). Given this, the fact that not all subordinate constructions allow Move, but only a subset of them do, is not directly a problem for my analysis. The analysis

As pointed out in Chapter 1, evolution is taken not to throw a good thing away, but to build upon it, or to add to it. So, if adjunction and conjunction proved to be useful syntactic mechanisms in a proto-syntactic stage, the later stages did not have to discard them, but could continue to use them in specialized functions. This is also what happens in present times with grammaticalization of subordination, as well as with grammaticalization processes in general (see e.g. Heine and Kuteva 2007). Overlap and (partial) specialization are properties of evolutionary tinkering, rather than of optimal design.

Grammaticalization is relevant for my approach because it shows that this type of change is in principle possible (see also Fitch 2010). When processes of grammaticalization happened for the first time, they would have driven biological selection toward developing brains that can support the processing of such abstract categories and their projections. Once the processing mechanisms evolved to a certain point, then grammaticalization processes could, in principle, operate without biological evolution. However, as discussed in much more detail in Chapter 7, there is no guarantee that any of these processes will not, for some reason and in certain circumstances, trigger genetic selection.

As pointed out in Chapter 4, there are concrete and tangible advantages to each postulated stage of syntax. The conjunction stage has an advantage over the adjunction stage in that it provides more robust evidence for proto-Merge, by including the segmental glue. In addition to facilitating Move, the hierarchical, subordination stage also provides a recursive mechanism for embedding multiple viewpoints one within another, as discussed in detail in Chapter 4. Thus, if subordination (as well as Move) is an innovation resulting from evolutionary tinkering, then subordination would have significantly increased the expressive power of language, in a concrete manner, and thus, unlike Subjacency, constitutes a plausible target for natural/sexual selection.

In this evolutionary perspective, rather than a system designed from scratch in an optimal way, syntax is seen as a patchwork of structures incorporating various stages of its evolution, giving an impression, or an illusion, of Subjacency. It follows from this approach that Subjacency is not a principle of syntax, or a principle of any kind, but rather just an epiphenomenon. Subjacency or islandhood can be seen as the default, primary state of language, due to an evolutionary base of language which was without Move. This default state can be overridden in certain evolutionarily novel constructions, such as subordination.

proposed here posits a different question than the traditional analyses: the question here is not what non-complements and complement islands have in common, the question pursued by Subjacency accounts, but rather how complement islands differ from complement non-islands. Exploring this question further may give new insights into the nature of Move, and language in general.

5.5 Conclusion

This chapter has pointed out that syntactic islands do not form a natural class, but that non-islands do, and that, for this reason, there can never be a principled, unified account of islandhood/Subjacency. My proposal is that Subjacency is not a specific principle of syntax, but rather the default state of syntax, dating back in time to the evolutionary beginnings of language, in which Move, and functional projections that facilitate Move, were simply unavailable. I have hypothesized that two initial stages in the evolution of syntax do not exhibit Move: the adjunction/parataxis stage, and the coordination stage. In this analysis, Move and subordination are later innovations, made possible by the emergence of specialized functional categories and their projections, such as TP and CP. Present-day sentences can still include various fossil constructs lacking Move, specifically adjuncts and conjuncts, which are then seen as islands.

My proposal reverses the direction of syntactic evolution hypothesized in Newmeyer (1991), who also explores a gradualist approach to syntax. While Newmeyer assumes that the initial stages of syntax were characterized by Move free of Subjacency, I propose exactly the opposite, that islandhood (or the state with no Move) was the norm in the previous stages, and that Move was an innovation. This reversal allows me to kill three birds with one stone. First, it provides some rationale for characterizing islandhood/Subjacency as the default state of grammar, rather than as a constraint on grammars. Second, this allows me to explain why various fossilized expressions (arguably “living fossils” of this proto-syntax stage) cannot be manipulated by Move.

Third, and most importantly, this allows me to address the question of how or why the progression took place from the proto-syntactic stages with no Move and no subordination, to the stage(s) with Move and subordination. Instead of targeting the abstract and obscure Subjacency by natural selection, as per Newmeyer’s (1991) proposal, my proposal targets the emergence of subordination (Move emerging in conjunction with it). In comparison to its more primary counterparts (adjunction and coordination), subordination provides a clear and concrete advantage in the expressive power of language. One such advantage is that subordination affords the possibility to recursively and unambiguously embed/nest multiple viewpoints one within another.

This chapter offers a hypothesis which is consistent with a lot of descriptive data, with how grammaticalization processes work, as well as with many studies in language acquisition and processing, as discussed in Chapter 4. Finally, an important advantage of this proposal is that it does not force us into the conclusion that syntax is all or nothing, and that the evolution of syntax as a whole had to have been a sudden and passive event, passive in the sense that its evolution was parasitic on

some other event. For example, Gould (1987) and Chomsky (1988) have proposed that syntax can just be a consequence of an increase in the size of the brain, or of some general laws of growth. The approach explored here leaves open the possibility that syntax played an active role in shaping human brains. Another important advantage of this approach is that it reveals how the incremental nature of the evolution of syntax can actually shed light on the very properties of its design.

Exocentric VN compounds: The best fossils

6.1 Introduction

This chapter looks at a host of surprising properties of VN compounds, such as *pick-pocket*, *turn-coat*, *spoil-sport*, *cry-baby*, across a variety of languages, focusing primarily on those found in English and Serbian. My argument is that the grammar behind these exocentric compounds is a survivor (“living fossil”) of an early stage of syntax in language evolution, and that by looking at their structure we can get a good glimpse into the workings of proto-syntax. Jackendoff (1999, 2002) has proposed that the evolution of syntax might have preserved “fossils” of previous stages in its later stages (see also Bickerton 1990), mentioning in particular compounds (e.g. *snowman*) as one such living fossil (see Section 1.6).

I have argued that specifically exocentric VN compounds constitute the most plausible candidate for a syntactic fossil featuring a verb (Progovac 2009a, 2012). When it comes to their structure (or the lack thereof), my argument is that VN compounds, at least in English and Serbian, are a clear product of the paratactic proto-grammar, as introduced in Chapters 2–4. These compounds are best analyzed as involving a single application of (proto-)Merge/Conjoin (of Chapter 4), to exactly two words, a verb and a noun, where the noun stands as the verb’s only (proto-)argument. The thematic (theta) role of this noun, even though typically theme (object-like), can be shown to be largely underdetermined, in fact absolutive-like, corroborating the proposal that these compounds are flat, paratactic structures, rather than hierarchical structures equipped with null projections and null arguments (Section 6.2). I will argue that the relationship between the verb and the noun in these compounds is that of proto-predication (see e.g. Gil 2012), a precursor to true predication (for the notion of a proto-role, see Section 3.4.2; also discussion below). Section 6.3 compares VN compounds with their more complex hierarchical counterparts, bringing to light the sharp differences between them, but also continuity in the sense that the former provide scaffolding for building the latter. Consistent with the theme of this monograph, the structure of VN compounds integrates into the structure of their more complex hierarchical counterparts.

It will also be shown that the verb in these compounds surfaces in what at least synchronically appears to be the imperative form, the kind of imperative that is also found in other (frozen) expressions. This is unmistakably the case with Serbian VN compounds (Section 6.4), but the same has also been proposed for VN compounds in other languages, including other Slavic and Romance languages (Section 6.5). As will be shown, VN compounds across languages, not only Indo-European (IE), but also non-IE, exhibit striking parallelisms both in form and in imagery (Section 6.5).

Exocentric VN compounds specialize for derogatory reference when they refer to humans, providing a good glimpse into how comparable expressions might have played a role in (ancient) ritual insults, which is why these fossils are of significance for sexual selection considerations (Progovac and Locke 2009), as addressed in Section 6.6, as well as in Chapter 7. As pointed out in Chapter 1, the present-day compounds, as well as all the other fossils discussed in this book, are only to be seen as approximations of the structures once used by our ancestors. Some corroborating evidence and testing grounds for the proposal in this chapter come from language acquisition studies and language representation in the brain (Section 6.7). To the extent that their structure and use can best be understood in an evolutionary framework, these compounds constitute an argument for the gradualist approach to the evolution of syntax, for the same reason that finding fossils elsewhere would.

6.2 Paratactic grammar behind VN compounds

This section focuses on the type of (proto-)Merge that characterizes VN compounds and concludes that the grammar behind these compounds, including their absolutive-like and exocentric nature, begins to make sense only if seen as a fossil of the very beginnings of syntax, capable of producing only flat, paratactic structures.¹ This would be the hypothesized paratactic proto-syntax stage of Chapters 2–4. In VN compounds, the noun is the verb's only (proto-)argument, which is absolutive-like in nature, as established in Section 6.2.1. The exocentric nature of VN compounds is addressed in Section 6.2.2, where it is shown that absolutivity and exocentricity in this case are just two sides of the same coin.

6.2.1 Absolutive-like proto-predication

As proposed in Chapter 3, the simplest possible grammar involving predication is a flat, intransitive, absolutive-like grammar, the kind which licenses only one argument per predicate, and which blurs the distinction between subjects and objects. If we consider all the data involving VN compounds, it becomes obvious that the grammar

¹ See Jackendoff (1999, 2002) for the proposal that adjunction/parataxis in general is a protosyntactic fossil; see Chapter 4 of this volume for an extensive discussion of the reach of parataxis in proto-grammars and modern grammars.

behind VN compounds is also absolutive-like in this sense. The noun in VN compounds is not always the object or theme of the verb, as is typically assumed in the literature. Consider the following data from English first:

- (1) pick-pocket, scare-crow, turn-coat, dare-devil, hunch-back,
wag-tail, tattle-tale, kill-joy, cut-purse, spoil-sport, saw-bones,
Shake-speare, Burn-house, Drink-water, Bere-water, Drynk-pany
(drink-penny, miser), Pinch-penny (miser)
- (2) rattle-snake, catch-phrase, cry-baby, stink-bug, worry-wart, copy-
cat, tumble-weed, scape-goat, turn-table

While the nouns in the compounds in (1) are object-like, the nouns in (2) are subject-like, occasionally involving agents (e.g. *cry-baby*, *copy-cat*).²

The situation is the same in Serbian. While the composing nouns in the compounds in (3) are object-like, those in (4) are subject-like. Even though the data in (4a) can be considered as unaccusative, with the nouns analyzable as themes, those in (4b) involve agents. It follows that it is not possible to describe these compounds as uniformly involving objects, or even themes, and that the only unified description is the one that invokes absolutive-type roles.

- (3) cepi-dlaka [split-hair = hairsplitter]
deri-koža [rip-skin = person who rips you off]
ispi-čutura [empty-flask = drunkard]
kljuj-drvo [archaic: peck-wood = wood-pecker]
kosi-noga [skew-leg = person who limps]
muti-voda [muddy-water = one who muddies waters]
- (4) a. duri-baba³ [sulk-old.woman=who sulks like an old
woman]
kaži-prst [show-finger=index finger]
smrdi-buba

² The terms object-like and subject-like are used here in the sense that the noun arguments would surface as objects or subjects, respectively, in a corresponding sentence. While the sentences *A snake rattles*, or *A baby cries*, involve these nouns as subjects, the sentences *He picks pockets* or *He kills joy* involve these nouns as objects. See Chapter 3 for various additional constructions across languages which do not clearly distinguish between subjects and objects.

A reviewer points out that some VN compounds feature nouns that are not clearly either subject-like or object-like, such as *scatter-brain* and *jump-rope*. This may still be consistent with the proto-role characterization of proto-predication (Section 3.4.2). The reviewer also brings up compounds created by merging prepositions and verbs, such as *input*, *hand-out*, *follow-through*. If Heine and Kuteva's (2007) reconstruction is correct, then the category of prepositions was a later evolutionary development, not characteristic of the earliest proto-syntax stages.

³ As pointed out in Mihajlović (1992), *baba* is a difficult piece to translate since it involves layers of meaning, including "woman," "old woman," and "witch." In fact, many of these compounds are impossible to translate accurately, given that they preserve older uses and meanings of morphemes, no longer accessible to native speakers.

| | |
|---------------|--|
| | [stink-bug=bug species that stinks; person who stinks] |
| smrdi-vrana | [stink-crow =a species of crow] |
| tresi-baba | [shake-old.woman=who shakes/scares like an old woman] |
| visi-baba | [hang-old.woman=flower: snowdrop] |
| b. plači-drug | [cry-friend=who commiserates with you] |
| plači-baba | [cry-old.woman=cry-baby] |
| striži-buba | [grate-bug=an insect which pecks trees] |
| tuži-baba | [complain-old.woman=who complains like a woman] |
| trči-laža | [run-lie=one who spreads lies] |

Recall from Chapter 3 how absolutivity works in e.g. Tongan (Tchekhoff 1979: 409). When only one argument is present, an absolutive argument, it can be either subject-like or object-like, resulting in vagueness:

- (5) 'oku kai 'ae iká.
 PRES eat the.ABS fish
 "The fish eats."
 "The fish is eaten."

The lack of theta role specification on the noun is also noticeable with compounds such as *turn-table* and *turn-coat*, showing that, with one and the same verb, the noun can be either subject-like or object-like (see Section 3.3.2). As discussed in Section 6.3, hierarchical compounds, such as *table-turner*, show a precise thematic role assignment, and the noun in such compounds can only be interpreted as object-like. In other words, unlike with VN compounds, with *-er* compounds it is the grammar that dictates that the noun must be interpreted as object-like, given that the *-er* piece is associated with the role of agent.

The most expressive of VN compounds can in fact be doubly interpreted, allowing the noun to play the role of the agent and theme at the same time, providing a strong argument for the proto-linguistic character of these compounds. For example, English *dare-devil* is the one who dares the devil, and can also be the one who is a devil that dares.⁴ In Serbian *pali-drvce* [ignite-stick, matches], *drvce* is interpreted as both a theme and an agent (the stick is both ignited and igniting). Since both

⁴ According to e.g. the Online Etymology Dictionary, *dare-devil* consists of the verb *dare* and the noun *devil*, and "the devil might refer to the person, or the sense might be 'one who dares the devil (compare *scare-crow*, *pick-pocket*, *cut-throat*).'" Interestingly, some native speakers believe that only the former interpretation is behind this compound, while others believe that the latter interpretation is there; there is disagreement even among the reviewers of this book.

interpretations are available at the same time, this has to be a matter of vagueness/underspecification, rather than ambiguity (Progovac and Locke 2009; Progovac 2012). While vagueness is typically associated with paucity of structure, ambiguity is typically ascribed to distinct structural possibilities (see e.g. Kempson 1977 for the distinction).

My proposal is that an absolutive-like grammar underlies VN compounds, and that all the compounds illustrated above (1–4) involve the same kind of composition. It would be an error to treat (1) and (3) distinctly from (2) and (4). A unified (absolutive-like) analysis of VN compounds would immediately capture their identical morphological make-up, including the imperative morphology in Serbian (Section 6.4), as well as their shared (derogatory) semantics (Section 6.6).⁵

As shown in Section 6.3, all the VN compounds in Serbian (3) and (4) types alike, feature exactly the same morpho-syntactic frame, complete with an imperative form of the verb, calling for a unified analysis. While in English the form of the verb is unmarked, the similarity in structure and interpretation between e.g. English *rattlesnake* and Serbian *tresi-baba*; English *worry-wart* and Serbian *duri-baba*, strongly suggests that the English VN compounds also form a unified class. Section 6.2.2 on exocentricity provides further arguments for this unified analysis. In fact, the arguments for the absolutive nature and for the exocentric nature of these compounds are inextricably linked, and these compounds can only be understood if both of these crucial properties are considered together, as they are two sides of the same coin.

In the spirit of Downing (1977), Gil (2005) suggests that root NN compounds (e.g. *toothbrush*, *snowman*), as well as some other constructions in various languages, involve an association operator semantically. On the other hand, the semantics of VN compounds involve (a bit) more than just association; they involve a participant in the event, and thus a relationship which can be characterized as a precursor to predication, i.e., as proto-predication. In this respect, Gil (2012) has proposed that predication is a composite emergent entity, rather than a primitive, and that it brings together both thematic role assignment and headedness. In this light, VN compounds exhibit a rudimentary thematic role assignment, involving just one participant, but with no further theta-role specification, and with no headedness or hierarchy.⁶

⁵ While Carstairs-McCarthy (1992: 118) claims that the semantic relation between the noun and the verb is free in VN compounds, and may include an internal argument (but need not), Ackema (1998: 128), based on Dutch, claims that there are two types of VN compounds, depending on whether the noun is a complement or not. The considerations in this chapter strongly support the former view, i.e. a unified analysis of VN compounds.

⁶ As pointed out in Section 3.4.2, Dowty (1991) proposes that theta roles are not discrete, but can instead be seen as prototypes, including proto-agent and proto-theme roles. The participant role I am using here can be seen as the ultimate proto-role.

Proto-predication does not assume valence in the modern sense of the term, that is, it does not assume that the verbs in this stage necessarily require a certain number of arguments, the assumption which is also necessary to make for the one-word stage, as discussed in Section 4.2.2.

My conclusion is that the VN compounds in (1–4) are all instances of the same paratactic, absolutive-like proto-strategy, where the noun's thematic role is not structurally specified. While it is typically a theme, it can also be an agent, attesting to the proto-predication character of the compounding process. The next section gives further support to this view, considering how the exocentric nature of VN compounds is closely tied to their absolutive-like nature.

6.2.2 Exocentricity

It is typically reported in the linguistics literature, including textbooks, that VN compounds of the kind illustrated in (1) are exceptional in that they are exocentric (i.e. not headed), in contrast to the compounds illustrated in e.g. (6), which are headed by the second/rightmost element in the compound (e.g. Spencer 1991; Selkirk 1982):

- (1) pick-pocket, scare-crow, turn-coat, dare-devil, hunch-back, wag-tail, tattletale
- (6) toothbrush, headboard, bedroom, blackboard, navy-blue

While a *bedroom* is a kind of *room*, and *navy-blue* is a kind of *blue* (with *room* and *blue* acting as heads), a *turncoat* is neither a kind of *coat* nor a kind of *turn*. It is rather a person who (metaphorically speaking) turns his coat (a traitor), even though there is no morphological piece, at least not an overt one, contributing to the meaning *person*.

And even though the compounds in (2) and (4) discussed in the previous section at first glance seem to pattern with those in (6), in the sense that a *rattlesnake* is a kind of *snake*, and a *show-finger* is a kind of *finger* (cf. *index finger* in English), there is good evidence for the view that they are in fact the same compound type as those in (1).

- (2) rattle-snake, catch-phrase, cry-baby, stink-bug, worry-wart, copy-cat, tumble-weed, scape-goat, turn-table

The clearest evidence is available in Serbian VN compounds, which feature the same type of (imperative) morphology in both (3) and (4) type compounds, but never in the compound type in (6). In fact, the compounds such as (6), considered to be root compounds, consisting of just two roots, are practically non-existent in Serbian, as mentioned in Section 1.6. Apart from very few creations, mostly borrowings, Serbian cannot use the root compound strategy in (6) productively. For example, one cannot create **krevet-soba* (lit. bed-room), or **kafa-sto* (lit. coffee-table) in Serbian. Instead, one uses phrases of different kinds to express similar concepts, such as *spavaća soba* (lit. sleeping room), or *sto za kafu* (lit. table for coffee). It is clear in Serbian that the imperative compounds in (4) cannot be the product of the root compound strategy, of the kind exemplified in English (6). Instead, this is the exact same strategy used to form (imperative) compounds in (3).

To recapitulate, the argument for the absolutive-like, exocentric nature of VN compounds is as follows. Given that Serbian does not really have root compounds, and certainly not any root compounds with imperative morphology, and given that compounds in (3) and (4) show completely identical morphological make-up, including the imperative form of the verb, the conclusion must be that the compounds in (3) and (4) in Serbian are a product of the same compounding strategy. Given that some of these compounds involve object-like predication (3), and others subject-like predication (4), the unified analysis of these compounds must invoke the absolutive-like analysis. Even though in English there is no clear morphological evidence to show if the compounds in (2) pattern with those in (1) or with those in (6), I propose to extend the unified analysis to English VN compounds as well, for the reasons mentioned below. However, if it turns out that the English data in (2) are just (headed) root compounds, the data in Serbian still remain a clear absolutive-like fossil.

I can offer the following reasons for treating all English VN compounds discussed so far, including those in (2), as exocentric, absolutive-like creations. First of all, unlike root compounds, which are extremely productive in English, the VN strategy, both in (1) and (2), is highly restricted and unproductive.⁷ Second, when they refer to humans, the compounds in (2) tend to be pejorative, just like their counterparts in (1), as is obvious from e.g. *cry-baby*, *worry-wart*, *copy-cat*. Furthermore, as discussed in Section 6.5, the VN compounds across different languages involve very similar images and concepts, typically combining simple, basic words. As pointed out in the previous section, there are clear parallels in the interpretation and imagery of English *rattle-snake* and Serbian *tresi-baba*; English *worry-wart* and Serbian *duri-baba*, suggesting that VN compounds in English should receive the same unified analysis that is inescapable in the case of Serbian VN compounds.

Exocentricity is a surprising property, given that all morpho-syntactic structure (derived by Merge) is considered to be headed, headedness and hierarchy constituting the hallmarks of Merge. According to e.g. Williams (1981), compounds and affixation in morphology are also subject to headedness, more specifically right-hand headedness, with the rightmost morpheme serving as the head of the whole compound/word. While Williams' (1981) Righthand Headedness Rule seems applicable in describing the headed compounds in (6), it does not apply to the VN compounds in (1). This is only one of several ways in which VN compounds are nonconforming.

⁷ While these VN compounds are no longer productive in English, it is interesting that they are still accessible to the brain. As pointed out to me by Ana Progovac (p.c. 2013), one can find an online fantasy name-generator for insults (<http://www.rinkworks.com/namegen/>), which generates a list of potential derogatory names for characters and a lot of them are in fact VN compounds. Another example of a recent creation is *sell-sword*, used in the sense of mercenary, which figures in the title of the trilogy of fantasy novels *The Sellswords*, written by R. A. Salvatore.

The few references that address the structure of VN compounds of type (1) typically attempt to make them more streamlined, more conforming to the present-day accusative-style grammars, by endowing them with null elements and covert structure. Marchand (1969) proposed that VN compounds, which he calls “pseudo-compounds,” are derived by a null affix which serves as their head (see also Rohrer 1977 for French and Lieber 1992).⁸ More recently, Ferrari (2005), based on Italian data, explores an analysis of VN compounds which posits a null head and an Aspect Phrase inside these compounds, rendering them headed by a null affix. I explore an approach to VN compounds, at least those found in English and Serbian, which does not posit any covert structure or null elements, embracing the traditional view of these compounds as exocentric (but see Section 6.5.2 for Romance languages possibly being an exception in this respect). This in turn leads to an absolutive-like analysis. As this chapter will show, there are many reasons to adhere to this view.

In addition to the observed ambivalence in theta-role assignment, Serbian VN compounds are also ambivalent when it comes to determining what counts as head with respect to agreement possibilities. In some sense, the noun inside Serbian VN compounds seems to act as a morphological head of the whole compound, influencing agreement possibilities, but in another sense, it does not, as illustrated in the following table:

| | | | | |
|-----|--|---------------------------|-------------------------------------|----------------------------|
| (7) | <u>Nominative</u> | | <u>Accusative</u> | |
| | ta. _F /taj. _M (this) | trči-laža. _F | tu. _F /tog. _M | trči-laž-u. _F |
| | ta/taj | ispi-čutura. _F | tog/tu | ispi-čutur-u. _F |
| | taj | jebi-vetar. _M | tog | jebi-vetr-a. _M |
| | | | | Animate |
| | taj | vadi-čep. _M | taj | vadi-čep. _M |
| | | | | Inanimate |
| | to. _N | pali-drvcе. _N | to. _N | pali-drvcе. _N |

For the F(eminine) noun *čutura* [flask], the compound is declined as a simple F noun would be, as demonstrated by the characteristic F accusative ending *-u* (*čuturu*). The choice of the demonstrative is also influenced, although not determined, by the F form of the noun: if the noun is F, the demonstrative for the whole compound can be either F or M(masculine), the latter choice probably available by default (see Ferrari 2005 for an important role played by default M gender in compounds and word formation in general).⁹ The M option suggests that the noun in a VN

⁸ The null affix can be seen as perhaps a null counterpart of the morpheme *-man*, or *-er*. Marchand’s view is criticized in Langendoen (1971) and Ljung (1975), who favor the ellipsis approach (the term ellipsis is also used in Jespersen 1954). Warren (1978: 27) uses the term “incomplete compound” for a host of different types of compounds, including compounds such as *egghead*, which she analyzes as missing the morphological piece corresponding to *man*. *Egghead* type compounds may also be of evolutionary significance.

⁹ On the other hand, Ferrari (2005) reports that Italian VN compounds are uniformly M, suggesting that they may have more morpho-syntactic structure, including possibly a null M suffix.

compound is not unambiguously its morphological head. Also, the F demonstrative can be freely used with VN compounds even when they refer to males.

If the noun is inanimate M (*vetar* [wind]), and the compound human/animate, the demonstrative must be M as well, but the whole compound in the accusative form would follow an animate accusative pattern, with an ending in *-a* (*jebi-vetr-a*), suggesting again that the final (inanimate) noun is not really the head of the compound. On the other hand, if the compound as a whole refers to an instrument/inanimate object (*vadi-čep*), and if, moreover, its noun is inanimate and M (*čep* [cork]), then the demonstrative must be M, and the whole compound also follows the accusative inanimate M pattern. When the noun is inanimate N (euter) (*drvce* [stick]), and the whole compound is also inanimate, the demonstrative must be N as well, and the accusative follows the inanimate pattern. These patterns point to some unusual strategies and compromises in determining agreement, which would be understandable if these compounds lack morpho-syntactic heads. The comparison between VN compounds and their hierarchical *-er/-ac* counterparts in the following section reinforces the conclusions reached in this section.

6.3 A comparison with the hierarchical verbal compounds

Recall that the proposed analysis of exocentric compounds involves a flat, paratactic combination of a verb and a noun, its only argument, making use of a single instance of (proto)-Merge (or Conjoin in the sense of Chapter 4). Proto-Merge, creating non-hierarchical, flat structures, arguably coincides with rudimentary predicate-argument semantics, as established in the previous sections. From an evolutionary perspective, the structures created by proto-Merge, including VN compounds, can be seen not only as precursors, but also as necessary foundation for building more elaborate, hierarchical structures, including hierarchical verbal compounds discussed in this section.

Consider the following verbal (synthetic) compounds in English and Serbian, also composed of a verb and a noun, but involving additional morphology and structure:

- (8) truck-driver, meat-eater, brick-layer, story-teller, tax-payer, heart-breaker
- (9)
- | | | |
|-----------------|--|-----------------------------|
| kamen-o-rez-ac | [stone- _O -carve- _{AGENT} , | stone-carver] |
| srebr-o-ljub-ac | [silver- _O -love- _{AGENT} , | who admires money] |
| žen-o-mrz-ac | [woman- _O -hate- _{AGENT} , | woman-hater, misogynist] |
| ver-o-lom-ac | [faith- _O -break- _{AGENT} , | who converts] |
| brak-o-lom-ac | [marriage- _O -break- _{AGENT} , | who breaks marriages] |
| rib-o-lov-ac | [fish- _O -hunt- _{AGENT} , | fisherman] |

The two compound types, the exocentric VN strategy and the *-er/-ac* strategy illustrated in (8–9) are comparable given that both utilize the same free morphemes, a verb and a noun, to express similar concepts, which is especially clear with the following minimal pairs, one involving a VN compound, and the other an *-er/-ac* compound:¹⁰

- (10) a. *der-i-koža* [rip-IMP-skin, one who rips you off]
 kož-o-der-ac [skin-O-rip-AGENT, skin-ripper, one who
 rips you off]
- b. *liš-i-sahan* [lick-IMP-basin, boot-licker]
 čank-o-liz-ac [basin-O-lick-AGENT, boot-licker]
- (11) *kill-joy* vs. *joy-killer*; *Bere-water* vs. *water-bearer/carrier*

The *-er/-ac* compounds not only have more morphological pieces than the VN exocentric compounds, but they also show an obligatory rearrangement of the two free morphemes, the verb and the noun. One approach to this is to take VN compounds to reflect the underlying, basic word order (e.g. Lieber 1992; Murray 2004) and the *-er/-ac* compounds to involve a rearrangement/Move of constituents, as illustrated below.

According to e.g. Roeper (1999: Footnote 32) and Progovac (2005b), *-er/-ac* compounds have an additional layer of structure, the transitivity layer, possibly vP, where the agentive morpheme *-er/-ac* is generated, the way agents are in the Minimalist Program.¹¹ Recall from Chapter 3 that transitive structures are analyzed in Minimalism as involving a vP layer, while intransitive structures, especially absolutive-like structures, need not have the vP layer. Given the flat/non-hierarchical (basically small clause (SC)) analysis of VN compounds explored in this chapter, these compounds certainly lack the vP layer. In this respect, they contrast with *-er/-ac* compounds, which have hierarchical structure, and possibly also involve Move/incorporation of the internal argument into the verb (e.g. Baker 1988; see also Lees 1960; Roeper and Siegel 1978; Lieber 1992).¹²

¹⁰ The two compounds in (10b), coming from two different dialects, clearly illustrate the distinction in the use of the verb form: imperative in the VN compound (*liši* in both dialects), and the root form in *-ac* compounds (*liz* in both dialects). The imperative morphology in VN compounds will be discussed at length in Section 6.4.

¹¹ For my purposes, the label for this projection is not as important as the need to capture the layering/shelling effect of these compounds; a nominal equivalent of vP, an nP shell, would do just as well (see e.g. Ferrari 2005).

¹² For postulating VP in nominalizations, see e.g. Lees (1960); Lieber (1992); Fu, Roeper, and Borer (2001); van Hout and Roeper (1998); for movement/incorporation in word formation, see e.g. Fabb (1984); Sproat (1985); Roeper (1999). For some more recent syntactic approaches to word formation, see also Halle and Marantz (1993); Marantz (1997); Josefsson (2001); Julien (2002); Lacarme (2002); Pyllkkänen (2002); Ferrari (2005); Roeper (2005); and references cited there.

- (12) a) [_{SC} kill joy] → [_{VP-er} [_{SC} kill joy]] → [joy-kill-er]
 b) [_{SC} der[i] koža] → [_{VP} -ac [_{SC} der koža]] → [kož-o-der-ac]

According to this analysis, just like the small clause in general provides the platform for building the TP or vP (Chapters 2 and 3), the VN configuration provides the foundation for building the more complex compound. As shown in (12), the *-er/-ac* attaches to the small clause, building the complex compound upon the foundation of the simpler one. What I am proposing is that the simpler, paratactic structures literally provide a concrete syntactic basis upon which the more complex structures have to be built. As seen in Chapter 2, there is empirical evidence that the TP is superimposed upon the SC. The question now arises if there is any such empirical evidence that the paratactic VN foundation provides the scaffolding for the *-er/-ac* compounds. This question can best be answered by considering an alternative analysis, which does not assume this kind of scaffolding.

An alternative analysis of *-er/-ac* compounds would be to treat them as NN compounds, *truck + driver*, where the second noun happens to be derived by the suffix *-er/-ac* (e.g. Selkirk 1982; Spencer 1991). While this analysis may work for some *-er* compounds, such as *truck-driver* in English, it does not work for many others. Jespersen (1954: 293) points out that derivations such as *sound-sleeper* cannot be derived by combining the adjective with the noun *sleeper*, but rather by adding *-er* to the foundational combination [*sound sleep*]. The following examples illustrate that neither English nor Serbian *-er/-ac* compounds can be uniformly derived through an NN compounding process, given that the second noun often does not have a derivation independently of the compound (see also Warren 1984: 233; Spencer 1991; Murray 2004):¹³

- (13) brick-lay-er (*layer as Agent)
 story-tell-er (*teller as human Agent)
 tax-payer (*payer)
- (14) kamen-o-rez-ac 'stone-carver' (*rezac)
 srebr-o-ljub-ac 'silver-lover' (*ljubac)
 žen-o-mrz-ac 'woman-hater' (*mrzac)
 brak-o-lom-ac 'marriage-breaker' (*lomac)

Once again, just as is the case with small clause derivations of sentences (TPs) discussed in Chapter 2, the layering/scaffolding approach, which takes the (VN)

¹³ As pointed out by a reviewer, it is not impossible to say “a layer of bricks,” or “a teller of tales.” But these nouns still differ from other nouns in that they require such *of* complements. In Serbian, even such phrasal realizations are completely ungrammatical (*rezac kamena = “carver of stone”). In fact, Serbian *-ac* specializes for attaching to the VN basis, and is only rarely found outside of compounds, that is, attached directly to a verb. Instead, different derivational suffixes are used to derive nouns from just verbs, such as *-ač* in *pliv-ač* (swimm-er).

small clause to be the foundation (see (12)), sheds light on the otherwise unexpected properties of these compounds.

It is also of note here that *-ac* compounds in Serbian necessarily feature a vowel *-o*, which is often seen as a linking vowel (but see Progovac 2005b for the default agreement analysis). What this means is that *-ac* compounds in Serbian have four pieces of morphology, certainly more than VN compounds. Recall the proposal in Chapter 4 that the paratactic stage of grammar was followed by a proto-coordination stage, characterized by linkers/coordinators, with little or no semantic import. An interesting question then arises with respect to *-ac* compounds in Serbian: are they created by the coordination/linker type of grammar, or by true hierarchical grammar? Most likely, these compounds have elements of both, and represent fossilized intermediate structures.

As an alternative to the derivation in (12), one can also consider an analysis according to which *-er/-ac* suffix is an ergative suffix (12'), added to the absolutive compound base, and possibly attached by adjunction (see Chapter 3 for discussion and references on the attachment of ergative phrases.)

- (12') a) [_{SC} kill joy] → [_{SC} -er [_{SC} kill-joy]]
 b) [_{SC} der[i] koža] → [_{SC} -ac [_{SC} der-koža]]

The added precision in theta-role assignment in *-er/-ac* compounds would come from this added agentive argument, the morpheme *-er/-ac*, whether it is an agent in vP (12), or an ergative adjunct (12'), necessitating that the lower (absolutive-like) argument be a non-agent. In fact, the ergative analysis would have an added benefit of explaining why *-ac* in Serbian can only attach to compounds (Footnote 13): ergative arguments are typically only added to structures which already contain an absolutive argument. If so, then Serbian *-ac* compounds are yet another example of ergative syntax at work in Serbian (see Chapter 3 for more examples).

As pointed out in Section 6.2, the grammar of VN compounds resembles the grammar of absolutive intransitives, as illustrated in Tongan (5). When only one argument is present, the absolutive argument, it can be either the agent or the theme/patient of the action. However, once a specifically marked agent is introduced (ergative), its very presence renders the absolutive argument as semantic patient/theme (see Chapter 3 for further examples and details). This is exactly what happens with e.g. the compound *dare-devil*, which is less specified in comparison to *devil-darer*. In other words, the one-argument proto-grammar is underspecified when it comes to the nature of theta roles, but the addition of an external, agent argument leads to more precision.

Even though one compound type can be shown to be more complex than the other, it is significant that there is continuity of structure between the two compound types, where one type literally provides the (paratactic) scaffolding for the other, as illustrated in (12) and (12') above. This is consistent with the main theme of this

monograph, which is that simpler syntactic structures integrate into more complex ones, serving as their foundation (see e.g. Chapters 2 and 3 for small clauses and TPs/vPs). Some corroborating evidence for the continuity between VN and *-er* compounds comes from the way children acquire compounds, as discussed in Section 6.7. The following section provides yet another reason for treating VN compounds as evolutionary fossils.

6.4 A surprising verb form: The imperative

Linguists and grammarians converge on the (surprising) conclusion that VN compounds in Serbian consist of an imperative verb plus a noun (Stevanović 1956; Mihajlović 1992; Maretić 1899; Belić 1949; Živanović 1904; Progovac 2005b, 2010c). This is significant since it may push the ultimate analysis of this compound strategy into the deep evolutionary past.

The imperative in Serbian has a characteristic *i/j* ending, as can be seen from the examples below. Although there is an overlap with some verbs (marked as IMP/3SG) below, those verbs which have distinct endings for the base 3SG form (third person singular present) and for the imperative (IMP) unmistakably use the imperative form in these compounds, whether these compounds involve object-like nouns (15a) or subject-like nouns (15b) (see also Section 6.2).¹⁴

(15) VN compounds as common nouns in Serbian

a) with object-like nouns

| | | |
|-------------|--|-------------------|
| cepi-dlaka | [split-hair = hairsplitter] | IMP ¹⁵ |
| deri-koža | [rip-skin = person who rips you off] | IMP |
| ispi-čutura | [empty-flask = drunkard] | IMP/3SG |
| jebi-vetar | [screw-wind = charlatan] | IMP |
| jedi-vek | [eat-life = one who constantly annoys] | IMP |
| kljuc-drvo | [archaic: peck-wood = wood-pecker] | IMP |
| liži-sahan | [dialectal: lick-basin = boot-licker] | IMP |
| kosi-noga | [skew-leg = person who limps] | IMP |
| mami-para | [lure-money = money-grabber] | IMP/3SG |
| muti-voda | [muddy-water = one who muddies waters] | IMP/3SG |
| pali-drvce | [burn-stick = matches] | IMP/3SG |
| pali-kuća | [burn-house = one who burns houses] | IMP/3SG |

¹⁴ As pointed out in Section 1.6, there are VV compounds in Macedonian which involve two imperative verbs strung together, as in *veži-dreši* (tie-untie ‘an ignorant person’) (Olga Tomić, p.c. 2006).

¹⁵ The example *cepi-dlaka* seems problematic at first glance since the imperative form of *cepiti* is *cepaj*, and not *cepi* (the base, 3SG present tense form is *cepa*.) However, prefixed perfective counterparts of the verb *cepiti*, such as *pre-cepiti*, *ot-cepiti*, have the respective imperative forms as *pre-cepiti* and *ot-cepiti*. The compound probably preserves a now obsolete imperative form *cepi*.

| | | |
|-----------------------------------|--|---------|
| podvi-rep | [fold-tail = someone who is crestfallen] | IMP |
| priši-petlja | [sow-loop = who clings onto another] | IMP |
| probi-svet | [break-world = wanderer] | IMP |
| raspi-kuća | [waste-house = who spends away property] | IMP |
| razbi-briga | [break-worry = game/entertainment] | IMP |
| seci-kesa | [cut-purse = pick-pocket] | IMP |
| vadi-čep | [extract-cork = corkscrew] | IMP/3SG |
| vrti-guz | [spin-butt = restless person, fidget] | IMP/3SG |
| vrti-rep | [wag-tail = restless person, fidget] | IMP/3SG |
| vuci-batina | [pull-whip = tramp, good-for-nothing] | IMP |
| b) <u>with subject-like nouns</u> | | |
| kaži-prst | [show-finger=index finger] | IMP |
| tresi-baba | [shake-old.woman=who shakes/scares like an old woman] | IMP |
| visi-baba | [hang-old.woman=flower: snowdrop] | IMP/3SG |
| plači-drug | [cry-friend=who commiserates with you] | IMP |
| plači-baba | [cry-old.woman=cry-baby] | IMP |
| striži-buba | [grate-bug=an insect which pecks trees] | IMP |
| tuži-baba | [complain-old.woman=who complains like a woman] | IMP/3SG |

In other words, all the compounds above marked as IMP can only be analyzed as involving an imperative verb, while the compounds marked as IMP/3SG are ambiguous between the two forms. Significantly, there are no compounds whose verb can be analyzed as 3SG, but not as IMP. To illustrate, in *seci-kesa*, *seci* is unambiguously IMP, as opposed to *sek*._{ROOT}, *seći*._{INF}, *seće*._{3SG.PRES}. Likewise, *plači* in *plači-drug* is clearly IMP, as opposed to *plakati*._{INF}, *plaće*._{3SG.PRES}, *plak*._{ROOT}. Any unified characterization of the morphological make-up of Serbian VN compounds must therefore refer to the imperative form:

(16) (Fossilized) imperative verb + noun (default case)¹⁶

It is significant to note that most of these compounds are derogatory when referring to humans. The exception are compounds created in more recent times, for official

¹⁶ All the compounds in the citation form have their nouns in the default nominative case (*seci-kesa*._{NOM}), and not in the accusative case (*seci-kesu*._{ACC}), which would be required in a sentential imperative counterpart (*Seci kesu!/*Seci kesa!* "Cut the purse!"). When these compounds are used in a sentence, the noun gets inflected for the appropriate case assigned to the position of the whole compound.

It is important to point out that these compounds in Serbian are not interpreted as involving commands of any kind, whether their nouns are subject-like or object-like. Only the form here is imperative, and the native speakers are typically not aware of this. I will give further arguments below for why this imperative form should be analyzed as a fossilized imperative.

naming purposes, which are not derogatory, but in fact tend to express grand wishes (see e.g. Yonge 1863: 441).

(17) VN compounds as non-derogatory names in Serbian

| | | |
|--------------|----------------------------------|---------|
| Bodi-roga | [pierce-horn?] | IMP |
| Bori-voj | [fight-war] | IMP/3SG |
| Brani-mir | [defend-world?] | IMP/3SG |
| Budi-mir | [be-world?] | IMP |
| Budi-sava | [be-?] (town) | IMP |
| Deli-blato | [divide-mud] (town) | IMP/3SG |
| Jezdi-mir | [ride-world] | IMP/3SG |
| Kolji-vratić | [cut-throat] | IMP |
| Kruni-slav | [crown-glory] | IMP/3SG |
| Pali-lula | [burn-pipe/straw?] ¹⁷ | IMP/3SG |
| Popi-voda | [drink-water] | IMP |
| Rasti-slav | [grow-glory] | IMP/3SG |
| Stani-mir | [stay-world] | IMP |
| Stani-slav | [stay-glory] | IMP |
| Sveti-mir | [bless-world] | IMP/3SG |
| Trpi-mir | [endure-world] | IMP/3SG |
| Strati-mir | [waste-world] | IMP/3SG |
| Veli-mir | [command world] | IMP/3SG |
| Vladi-mir | [rule-world] | IMP/3SG |
| Zlati-bor | [gild-pine] (mountain) | IMP/3SG |
| Zlati-slav | [gild-glory] | IMP/3SG |

As can be seen, these more recent creations also feature the imperative form of the verb (see Appendix 2 for more examples).

Even though English does not distinguish imperative from base and root forms, according to e.g. Jespersen (1954: 224), VN English compounds “often seem to originate in an ironical imperative.” Following Darmesteter (1894, 1934), Weekley (1916) also analyzes English VN compounds as consisting of the imperative verb + object, and sometimes an adverb (e.g. *Go-lightly*).¹⁸

¹⁷ Mihajlović (1992: 16, 136) suggests that *Pali-lula*, a place name, derives from *Pali-lila*, meaning ‘burn-straw/hay,’ the ancient image dating back to a pre-Christian (Old Hittite) ritual. If so, then the present-day form *Pali-lula* was derived by folk-etymology: *lula* means a (smoker’s) pipe, while *lila* has no meaning in present-day Serbian.

¹⁸ These data include examples from Weekley (1916); Jespersen (1954: 223–4; 347–50); Lees (1960); Marchand (1969: 380–2); Adams (1973); Groom (1937). For many more examples of English VN compounds, the reader is referred to these references (see also Appendix 1 of this Chapter).

A reviewer disagrees with Jespersen’s claim, noticing that there is no imperative interpretation in English compounds. However, Serbian VN compounds are also not interpreted as imperative, even though the form is unmistakably imperative. This imperative form will be analyzed below as a fossilized form, akin to

- (18) bang-straw (thresher), break-back, break-fast, break-neck, break-vow, break-water, burn-bag, burst-cow (insect), carry-all, catch-fly (plant), catch-penny, cease-fire, cover-shame (plant), cover-slut (apron), cure-all, cut-finger (plant), cut-throat, cut-purse, cut-water, do-nought, dread-nought (originally a person; later a battleship), fill-belly (glutton), fill-pot, find-fault, hang-dog (originally a person who hangs stray dogs), hang-man, heal-all (plant), hunch-back, kill-joy, kill-lamb (plant), kill-time, know-little, know-nothing, lack-brain, lack-bread, lack-grace, lack-land, lack-love, lack-luster, lack-wit, lick-box, lick-dish, lick-ladle, lick-platter, lick-pot, lick-spit, lock-jaw, make-mirth, make-peace, pass-port, pas-time, pick-lock, pick-purse, pick-thank, pinch-back (miser), pinch-belly, pinch-gut, pinch-penny, rake-hell (scoundrel, ruffian), rake-shame, save-all, saw-bones, scape-gallows, scare-crow, scatter-brain, scoff-law, scrape-gut (fiddler), shear-water (bird), shuffle-wing (bird), skin-flint (miser), sling-shot, spend-thrift (miser), spit-fire, spoil-sport, spurn-water, stay-stomach (snack), stop-gap, sweep-stake, swish-tail (bird), tangle-foot (whiskey), tear-thumb, tell-tale, toss-pot, tumble-dung (insect), turn-coat, turn-key, turn-penny, turn-skin, turn-spit, turn-table, wag-tail (bird)

While it is hard to tell what all the English words in (18) mean, if one selects only those for which the meaning is relatively clear, and which refer to humans as opposed to plants or objects, the list includes the following:

- (18') cut-throat, cut-purse, do-nought, dread-nought (originally a person; later a battleship), fill-belly (glutton), hunch-back, kill-joy, know-little, know-nothing, lack-brain, lack-grace, lack-land, lack-wit, lick-spit, pick-thank, pinch-back (miser), pinch-penny, rake-hell (scoundrel, ruffian), saw-bones, scatter-brain, scoff-law, scrape-gut (fiddler), skin-flint (miser), spend-thrift (miser), spoil-sport, tell-tale, turn-coat

They all seem to be derogatory, but even if just the majority of them were, this would still call for an explanation. This is in addition to previously introduced compounds, such as *tattle-tale*, *busy-body*, *cry-baby*, *crake-bone* (crack-bone). I do not know of any other morpho-syntactic process that has created so many pejorative terms.

English optative uses of verbs, as in *Long Live the King*, which show no agreement with the subject. As will be shown, this same form is also used as Historical Imperative in some dialects of Serbian. This is then just an ancient mood form that happens to coincide with the synchronic imperative morphology in Serbian.

As is obvious from Appendix 2, the older compounds in Serbian that refer to humans are also derogatory, and there are many more like that in Mihajlović's (1992) book. The exception is the newly created class of names in Serbian, given in (17). It is important, though, to focus on the compounds that refer to humans, for those that describe instruments or animals would not be useful as insults. Even though in medieval times these compounds sometimes showed "unquotable coarseness," Weekley maintains that this is a very expressive and convenient way of naming, which flourished in the thirteenth and fourteenth centuries. Most reference books do not include these compounds due to their obscene nature, driving them to virtual extinction, not only in English, but in other languages as well (see also Lloyd 1968; Darmsteter 1934; Mihajlović 1992).

Rolfe (1996) has hypothesized that humans initially used verbs to issue commands (imperative), even in the one-word (pre-syntactic stage), and much before using verbs to make statements. The imperative in general is among the first productive verbal forms used by children (e.g. Bar-Shalom and Snyder 1999) (see Section 6.7). It also tends to be the least marked verbal form across languages, and/or to preserve archaic patterns (see e.g. Dixon 1994: 189; Kuryłowicz 1964: 137).

Imperatives arguably also may provide some continuity with animal calls and other communicative signals, in the sense that they are calls for action, typically in the here-and-now. This would be consistent with e.g. Greenfield and Savage-Rumbaugh's (1990) and Tomasello's (2008) claims that non-human primates use communicative signals, both vocalizations and gestures, almost exclusively for imperative purposes. In addition, Millikan (2004) has argued that animal communicative signals are both indicative and imperative in force.

If the capacity to use the VN compound strategy emerged at an early stage of language evolution, when one-word utterances and imperatives ruled, then it is plausible that the compound-like names would have been put together using what was already there—the imperative-like verbs.¹⁹ But it is important to keep in mind that one is dealing here with a proto-imperative form, not with what is meant by imperative in present-day languages. This proto-imperative would have had a much wider range of functions than the modern imperative has today. In this respect, the quote by Speijer (1886: 271–3) regarding the imperative form in Sanskrit is useful: "Sanskrit 'imperative' comprises more than is conveyed by its European name. It is not only the equivalent of what we are wont to understand by this mood, but it is also expressive of wishes, benedictions, possibility, and doubt . . ."

¹⁹ Mihajlović (1992: 16, 136) suggests that *Pali-lula*, a place name, derives from *Pali-lila*, meaning 'burn-straw/hay,' the ancient image dating back to a pre-Christian (Old Hittite) ritual. If so, then the present-day form *Pali-lula* was derived by folk-etymology: *lula* means a (smoker's) pipe, while *lila* has no meaning in present-day Serbian.

In fact, this proto-imperative form is used in Serbian in other surprising functions as well, all of which can be considered as fossils. For example, some petrified optative/subjunctive forms such as English (19) are rendered as imperative forms in Serbian (20), the same forms that are found inside VN compounds:²⁰

(19) Long Live the King! God Forbid!

- (20) a. Pomozi Bog!
 Help-IMP God
 b. Hvali Bog!
 Praise-IMP God

Another example comes from the archaic Historical Imperative, which used to be productive in narratives, but is now only used in some dialects of Serbian (Stevanović 1966: 412–13):

- (21) A on ti skini motiku s ramena, zabij je u zemlju, ostavi fenjer kraj sebe i sedi na ladju.
 ‘And he take off-IMP the spade from his shoulder, stick-IMP it into the ground, leave-IMP the lantern by himself, and sit-IMP onto the boat.’

It is perhaps relevant for these considerations that the Slavic imperative descended from the optative mood expressing wishes (often indistinguishable from commands), which in turn descended from the ancient PIE injunctive (e.g. Belić 1960; Kiparsky 1968; Kerns and Schwartz 1972: 23; Stevanović 1974).²¹ The injunctive was initially an unmarked mood, but later specialized for non-indicative, “irrealis” moods, expressing wishes, commands, and/or exclamations).²² It is possible that VN compounds preserve approximations of this ancient mood morphology, which in Serbian happens to be rendered as imperative, via optative (see Progovac 2006, 2010c).

It is also relevant in this respect that swearing in present-day languages often involves verb forms which look like imperatives, but are not true imperatives in the modern sense of the word. These include e.g. *Damn (you)! Fuck (you)!*, as discussed in Dong (1971).²³ Such uses of verbs in swearing in fact resemble optatives in the sense that they impose wishes/curses upon someone. In that sense, such swear

²⁰ There is a name in Polish that has exactly the same make-up as (20b), as illustrated in (22) in Section 6.5.1.

²¹ According to Kiparsky (1968: 51), in Vedic, Greek, and Old Irish, injunctives are also a source of historical present, equivalent to the Serbian Historical Imperative discussed in the text.

²² See Section 2.2 for the discussion of (tenseless) injunctive mood in PIE in connection with small clauses, which are arguably tenseless creations.

²³ Dong is the pseudonym for linguist James McCawley. Notice that present-day imperatives necessarily feature reflexive pronouns, such as *Wash yourself!* Reflexives are also possible in some swear phrases (e.g. *Fuck yourself!*) on a different interpretation, although not with others (e.g. *??Damn yourself!*).

expressions can be seen as negative versions of optative phrases such as *Long Live the King!* in (19). These connections and overlaps with optatives and injunctives make it more plausible to accept the (proto-)imperative analysis of VN compounds (see Progovac 2010c for more details). Section 6.6 discusses evolutionary significance of swearing.

If indeed such VN compounds were among the first two-word creations involving proto-Merge, then it stands to reason that early language would have made use of what it already had at its disposal: (proto-)imperative verbs. The beginning of the category verb in human language may have been the (one-word) imperative utterance. The next section introduces data from additional languages, establishing further crosslinguistic parallels in the structure and use of VN compounds.

6.5 Crosslinguistic distribution and parallels

VN compounds are found in a variety of languages, including non-IE, showing striking parallels in form and imagery, as illustrated in this section.

6.5.1 VN compounds in other Slavic languages

In addition to the imperative analysis of Serbian compounds (previous section), the imperative analysis of VN compounds has also been proposed for other Slavic languages, including Bulgarian (Andreičin 1955) and Macedonian (e.g. Koneski 1954). For Polish, it is sometimes claimed that *-i* is a connecting/linking vowel (e.g. Ułaszyn 1923). Polish lost the imperative in *-i* by the end of the sixteenth century, and Mirowicz (1946) advocates a diachronic imperative analysis of VN compounds in Polish. According to Klemensiewicz, Lehr-Spławiński, and Urbański (1964: 256–7), VN compounds in Polish went through several stages, including an imperative stage. In any event, the diverging analyses of Polish and Serbian compounds simply reflect the fact that the marker *i/j* is still recognizable as an imperative marker in Serbian, but no longer in Polish. Once Polish lost the connection with *i/j* as an imperative marker, the original proto-Slavic paratactic VN strategy may have been reinterpreted as a proto-coordination strategy, reanalyzing *i/j* as a meaningless linker (see Chapter 4 for the progression of syntactic stages from parataxis to (proto-)coordination.)

The following are some examples from Polish, Russian, and Macedonian, featuring the same *i/j* ending.

- (22) Polish (supplied and/or glossed by Paweł Rutkowski, p.c. 2006)
- | | |
|-------------|--|
| Chwali-bóg | [praise-god] (name) |
| dusi-grosz | [squeeze-penny, miser] (cf. English <i>pinch-penny</i>) |
| goli-broda | [shave-beard, barber] |
| hulaj-dusza | [roister-soul, reveler, rioter] |
| Kopaj-gród | [dig-town] (place name) |

- | | |
|---------------|--|
| łami-strajk | [break-strike, strike-breaker] |
| łami-główka | [break-head. _{DIM} , puzzle, riddle] |
| mąci-woda | [muddy-water, troublemaker, brawler] (cf. Serbian <i>muti-voda</i>) |
| moczy-morda | [soak-muzzle, sot, drunkard] |
| obieży-świat | [trot-world, globe-trotter] |
| pali-woda | [burn-water, flibbertigibbet, madcap] |
| pasi-brzuch | [pasture-belly, glutton, lazybones] |
| pędzi-wiatr | [drive-wind, flibbertigibbet, madcap] |
| rzezi-mieszek | [cut-purse, pick-pocket] |
| wali-góra | [topple-mountain, giant of Polish folklore who could topple mountains] |
| wierci-pięta | [wiggle-heel, fidget] |
| wozi-woda | [carry-water, water-carrier] |
- (23) Russian (Yana Pugach, Maria Babyonyshev, Dina Brun, Natasha Kondrashova, Asya Pereltsvaig, p.c. 2006)
- | | |
|---------------|---|
| łomi-golovka | [break-head, brain-teaser/puzzle] |
| sorvi-golova | [cut-off head, dare-devil] |
| perekati-pole | [roll-over-field, tumbleweed] ²⁴ |
| verti-hvostka | [wag-tail, a bird] |
- (24) Macedonian (Olga Mišeska Tomić, p.c. 2006)
- | | |
|--------------|------------------------------------|
| gazi-bara | [tread-water] |
| isturi-čorba | [stick-out broth, tactless person] |
| zajdi-sunce | [set-sun, sunset] |

6.5.2 VN compounds in Romance languages

Verb-noun compounds are productive in some Romance languages, including Spanish, Italian, and French, which suggests that they might have acquired additional structure, at least the newly formed ones, and that they conform better to modern syntactic patterns. However, VN compounds are still marginal in Rumanian, where they “belong to affective and familiar language,” and where they are “exclusively epithets applied to persons in a contemptuous fashion, as are the earliest examples in the other Romance languages” (Lloyd 1968: 7).

Lloyd claims that Romance VN compounds were originally nicknames, usually playful and humorous, and that it was only around the twelfth/thirteenth century that the strategy was extended to names of places, instruments, occupations, plants. It could be that Romance VN compounds acquired more structure at this juncture in

²⁴ *Tumble-weed* itself belongs to the VN compound type, as per discussion in Section 6.2.

time, distinguishing themselves from the original pattern, still preserved in Germanic and Slavic languages.²⁵ Lloyd (1968: 20) believes that these compounds spread to more neutral contexts due to their expressiveness, and also due to the lack of a competing pattern, i.e. the lack of the English *-er* compound type (e.g. *dish-washer*). According to Lloyd (1968), many of the original VN compounds were used by the lowest classes of society, were coarse and humorous, and because of that did not enter the texts and reference books.

Here are some examples from Spanish, Italian, and French.

(25) Spanish (Murray 2004; Eugenia Casielles, p.c. 2012)

| | | |
|-----------------|-------------------------------|--------------------------|
| calienta-pollas | [heat-penises, a tease] | |
| espanta-pájaros | [scare-birds, scarecrow] | |
| lame-culos | [lick-asses] | |
| lava-manos | [wash-hands, bathroom sink] | |
| lava-platos | [wash-dishes, dishwasher] | |
| para-brisas | [stop-wind, windshield] | |
| para-caídas | [stop-falls, parachute] | |
| para-sol | [stop-sun, sunshade] | |
| pica-flor | [peck-flower, hummingbird] | |
| rasca-cielos | [scrape-sky, skyscraper] | |
| rompe-cabezas | [break-heads, puzzle] | (cf. Polish and Russian) |
| saca-corchos | [extract-corks, corkscrew] | |
| saca-muelas | [extract-teeth, hack dentist] | |

(26) Italian (Hall 1948b: 175-6; Murray 2004)

| | |
|---------------|--------------------------|
| akkatta-pane | [beg-bread, beggar] |
| akkiappa-kani | [catch-dog, dog-catcher] |
| faci-male | [do-evil, evil-doer] |
| gratta-cielo | [scrape-sky, skyscraper] |

²⁵ Not only are VN compounds in some Romance languages productive, but they also can be recursive, and often contain plural nouns inside them (see e.g. Murray 2004; Ferrari 2005). One example of a recursive Spanish VN compound is *limpia-para-brisas* ‘wipe-stop-wind, windshield wiper’ (Murray 2004). In English, only the complex *-er* counterparts are recursive (e.g. *dishwasher user*). A recursive V [VN] combination seems to me to be completely out of reach for English and Serbian VN compounds (**scare-pick-pocket* (one who scares pick-pockets); **dare-spoil-sport* (one who dares spoil-sports); **muti-ispī-čutura* (one who confuses drunkards)). Serbian and English VN compounds are neither productive nor recursive, and are thus likely to be better approximations of the postulated proto-syntactic constructs (for recursion, see Chapter 4). Italian and French VN compounds also differ from Serbian counterparts with respect to gender specification, as discussed in Section 6.2. It is also of significance that the productive, more recently created, VN compounds in Romance mostly refer to instruments, rather than people, contrary to what one finds in English and Serbian fossil compounds, as well as in Rumanian, as pointed out in the text. The idea is that the original creations of this kind targeted people, possibly for ritual insult purposes (Section 6.6).

| | |
|---------------|---------------------------------|
| lava-piatti | [wash-plate, dishwasher] |
| metti-male | [put-evil, trouble-maker] |
| spremi-limoni | [squeeze-lemon, lemon-squeezer] |

(27) French (some from Nyrop 1908; also Kate Paesani, p.c. 2006)

| | |
|----------------|-------------------------------------|
| accroche-coeur | [engage-heart, flirt] |
| Boil-eau | [drink-water] (name) |
| cache-col | [hide-neck, scarf] |
| coupe-bourse | [cut-purse, pick-pocket] |
| coupe-gorge | [cut-neck, rough neighborhood] |
| essuie-glace | [wipe-windshield, windshield wiper] |
| grippe-sou | [seize-up-penny, skinflint] |
| perce-neige | [pierce-snow, snowdrop] |
| porte-bonheur | [carry-happiness, lucky charm] |
| saute-mouton | [jump-sheep, leap-frog] |
| tire-bouchon | [cork-screw] |

It is intriguing that the imperative analysis has also been proposed for Romance VN compounds by many, including Diez (1838); Shulze (1868) (this reference also consults Sanskrit and Slavic and Germanic families); Darmesteter (1894) (a very extensive and comprehensive study and defense of the imperative analysis in Romance); Darmesteter (1934); Prati (1931, 1958); Migliorini (1946); Lloyd (1968) (see the latter reference for an overview of the imperative and non-imperative approaches to VN compounds). Most historical grammars generally followed Darmesteter's imperative analysis (e.g. Meyer-Lübke (1895: 213–14) and subsequent work; Adams (1913); de Diego (1914); Rohlf's (1954); while some advocated the third person singular analysis (e.g. Bolufer 1920: 170). The imperative analysis is challenged and argued against in Meunier (1875); Osthoff (1878) (Osthoff was criticized in Tobler 1886); Tollemache (1945); Heinimann (1949); Hall (1964, also 1948a,b). More recently, while Floricic (2009) explores an imperative analysis, Ferrari (2005) has argued against the imperative analysis, in a very thorough study of word formation in Italian and other languages.

My claim here is that those compounds which approximate proto-syntactic structures are more likely to exhibit ancient verb forms, including proto-imperative forms.²⁶ While preservation of structure in this close manner is by no means guaranteed or necessary, it is nonetheless possible that this syntactic mold (even though certainly not specific words) was passed on from generation to generation, with only minor adjustments to the morphology of the verb form, to best approximate

²⁶ In Romance, the (proto-)imperative analysis may be more appropriate for the original compounds than for the recently coined, productive compounds referring mostly to instruments.

the original compound. It is thus intriguing that so many researchers, working on diverse languages, converged on a conclusion that VN compounds involve a form that looks like imperative, even though such an analysis is obviously counterintuitive, “un vero controsenso,” as put in Tollemache (1945: 181). By embracing the imperative puzzle, as well as the traditional exocentric characterization of VN compounds, one is led to seek an explanation in the deep evolutionary past.

6.5.3 VN compounds in non-Indo-European languages

VN compounds with comparable morphological make-up, and with comparable metaphors, can also be found in non-IE languages, as illustrated in this section with Tashelhit Berber, Twi, and Chinese.

(28) Tashelhit Berber (spoken in Morocco; Dris Soulaïmani, p.c. 2007)

| | |
|------------|----------------------------|
| slm-aggrn | [suck.in-flour, butterfly] |
| ssum-izi | [suck-fly, thrifty person] |
| ssum-sitan | [suck-cow, insect] |

(29) Twi (spoken in Ghana; Kingsley Okai, p.c. 2011)

| | |
|-------------|------------------------------|
| Atoto-botom | [dip-in pocket, pick-pocket] |
| Kukru-bin | [roll feces, beetle] |
| Nom-mmogya | [suck blood, vampire] |
| Wodi-nii | [kill person, killer] |

(30) Chinese (Murray 2004; Haiyong Liu, p.c. 2006)

| | |
|------------|------------------------------|
| dean-shin | [stay-stomach, refreshments] |
| liing-shyh | [lead-affairs, consul] |
| ua-eel | [dig-ear, ear-pick] |

It should be noted in this respect that Tashelhit *ssum-sitan* [suck-cow] in (28) is closely parallel to Old English *burst-cow*, which also meant “insect,” and the drinking image for a miser *drynk-pany* [drink-penny] (1) is reminiscent of *ssum-izi* [suck-fly] in Tashelhit (28). Likewise, Twi *kukru-bin* [roll feces, beetle] in (29) involves the same image as English *tumble-dung* (insect), and there is also a clear parallel between the Twi word *atoto-botom* (29) and English *pick-pocket*.

The following table reveals further parallels in morphological make-up and metaphorical expression; many more can be found across the data provided in this chapter.

| (31) English | Serbian | French | Polish | Twi |
|--------------|-------------|--------------|---------------|-------------|
| Drink-water | Popi-voda | Boil-eau | | |
| cut-purse | seci-kesa | coupe-bourse | rzezi-mieszek | |
| pick-pocket | | | | atoto-botom |
| cut-throat | Koji-vratić | coupe-gorge | | |

| | | | | |
|-------------|------------|------------|------------|-----------|
| lick-pot | liži-sahan | | | |
| Bere-water | | | wozi-woda | |
| Burn-house | pali-kuća | | | |
| wag-tail | vrti-rep | | | |
| pinch-penny | | grippe-sou | dusi-grosz | |
| tumble-dung | | | | kukru-bin |

According to Lloyd (1968), the original VN compounds described people who were lazy, useless, careless in dress, idle, contemptible, criminal, stupid, uncultured, bullies, busybodies, flatterers, gluttons, drunkards, gloomy, cheating and swindling, misers, defective, of contemptuous professions.²⁷ If these descriptive words were not available to ancient humans, which is a reasonable assumption to make, then the VN naming strategy would have increased their expressive power (as well as the insulting power) enormously. In other words, the ability to use such compounding strategy successfully would have constituted an enormous expressive advantage over just using single-word utterances, an advantage which could have been subject to sexual selection, as discussed in the following section.

6.6 VN compounds and sexual selection

My proposal in this chapter is that VN compounds may represent the best fossils we have for the postulated intransitive, paratactic, two-word grammar stage, which moreover involves a verb(-like element) acting as a proto-predicate. Not only is the structure of these compounds rudimentary and unsyntactic in almost every sense of modern syntactic theory (flat structure, no headedness, no subject/object differentiation, no recursion), but this compound strategy specializes for derogatory reference and insult. Moreover, this strategy clearly illustrates how one can create hundreds of complex and abstract concepts out of a handful of concrete base words. This alone would have been enough to demonstrate to the ancient hominins the power of (proto-)syntax, and to involve them in a possibly cut-throat race toward evolving the capacity for syntax. This section looks into how creations comparable to VN compounds would have contributed to the sexual selection of (proto-)syntax.

It is important to point out that I am not saying that this kind of naming/insult strategy was the only benefit of proto-syntax, and the only reason for selecting syntax. Not at all. There are just so many benefits of being able to combine words into larger meaningful units that it would be trivial and pointless to list them here. What I am saying is that I have isolated the data that point to just one of these benefits, and even this one alone would have afforded such a significant concrete advantage that it could

²⁷ *Busy-body* is probably another VN compound expressing a concept that can hardly be expressed so succinctly and vividly in any other way.

have by itself triggered selection for proto-syntax. The more such factors at work, of course, the faster and more complete the selection would have been. Chapter 7 offers a concrete scenario which outlines how this process could have involved genes.

VN compounds across languages are typically playful, pejorative, and/or vulgar. Their expressive potential seems unmatched by any other (nick)naming strategy. As put in Darmesteter (1934: 443), the artistic beauty and richness of VN compounds (in French) is inexhaustible.²⁸ Mihajlović (1992) was equally impressed by the VN compounds in Serbian. He devoted his career to traveling to remote places and collecting over 500 Serbian place and people names in the form of VN compounds. He reports that these condensed compositions pack in them frozen fairy tales, proverbs, and ancient wisdoms and metaphors (1992: 8–9).

According to Progovac and Locke (2009), formation and use of VN compounds may have been an adaptive way to compete for status and sex in ancient times. Their successful use would have enhanced relative status first by derogating existing rivals and placing prospective rivals on notice; and second by demonstrating verbal skills and quick-wittedness (see Chapter 7 for a hypothetical scenario). Darwin (1874) identified two distinct kinds of sexual selection: aggressive rivalry and mate choice (see also Miller 2000), both of which seem relevant for the proposed use of exocentric compounds. Darwin (1872) also pointed out that strong emotions expressed in animals are those of lust and hostility, and that they may have been the first verbal threats and intimidations uttered by humans (Code 2005: 322).

Throughout recorded history, sexually mature males have issued humorous insults in public (Locke 2009; Locke and Bogin 2006). These “verbal duels” are taken to discharge aggressive dispositions, and provide a way to compete for status and mating opportunities without risking physical altercations (Marsh 1978; Parks 1990). In this respect it is significant that vulgar VN compounds in Serbian target males. For example, *jebi-vetar* [screw-wind, charlatan] is typically used to describe males. Even those compounds that seemingly describe females are typically used in reference to males, for a doubly insulting effect (Mihajlović 1992): *laj-kučka* [bark-bitch, loud and obnoxious person]; *lezi-baba* [lie-(old.) woman, loose woman or man].

In fact, it is hard to come up with an alternative explanation for the creation of hundreds of such brilliant and humorous insults. The vast number of these compounds (reported to have been in the thousands in medieval times) clearly exceeds what is needed for just survival. Such excess is typically ascribed to sexual selection forces. According to Miller (2000: 369): “if language evolved *in part* through sexual

²⁸ In his own words, “at the time of Renaissance, Ronsard introduced [VN compounds] in a new and original manner as epithets: *Jupiter lance-tonnerre, le soleil donne-vie, Hercule porte-massue* . . . It would be well could French poets again make use in lofty poetry of this class of epithets; for they may attain Homeric breadth” (Darmesteter 1934: 443).

choice as an ornament or indicator, it should be costly, excessive, luxuriant beyond the demands.”²⁹

In this respect, Franks and Rigby (2005) have performed experiments which found that males increase their creativity with language not only in the presence of attractive females, but also in the presence of male competitors. They did not find either of these effects with female subjects. Their test phrases involved unusual combinations of e.g. two nouns (such as *book bicycle*), and the subjects were asked to provide possible referents for such noun phrases. As independently established, the relation interpretation (such as “a bicycle for delivering books”) is considered by females to be less creative than property interpretations (such as “a book with two wheels.”) Their study thus provides evidence that males even today display their creativity and cognitive skills by using language. As pointed out in e.g. Miller (2000) and Franks and Rigby (2005: 208), human mate selection often involves display of cognitive traits by creativity in language use. Moreover, creativity is considered to be highly correlated with intelligence (Miller 2000).

The possibility that sexual selection played a role in evolving syntax is consistent with the findings reported in e.g. Ullman (2008) that there is a gender difference when it comes to language processing (see also Pinker and Ullman 2002), as discussed in Chapter 7.

6.7 Corroborating evidence and testing grounds

As argued in Section 6.3, the simple, paratactic VN compound structure provides a foundation/scaffolding for building hierarchical *-er/-ac* compounds in English and Serbian. Another reason to consider exocentric VN compounds as derivationally related to their *-er/-ac* counterparts comes from language acquisition studies, as pointed out in e.g. Lieber (1992). In addition, Clark, Hecht, and Mulford (1986) conducted an experiment in which they prompted children to produce novel *-er* compounds (see also Clark and Barron 1988). At around three, children consistently produced VN compounds such as “grate-cheese” instead of “cheese-grater,” “rip-paper” instead of “paper-ripper,” and “bounce-ball” instead of “ball-bouncer.” According to the authors, children begin by forming compounds with VN predicate order, basically from verb phrases (Clark, Hecht, and Mulford 1986: 26).³⁰ This seems

²⁹ As pointed out by a reviewer, there is no reason to believe that there were that many compounds at the onset of the paratactic stage, and I am certainly not claiming that. The sheer number of these compounds attests to their enormous creative potential, as well as to the fact that people got very good at creating them at some point, for some reason.

³⁰ While many have reconstructed SOV as the proto-world word order (e.g. Givón 1979; Newmeyer 2000; see also Aske 1998; Lightfoot 1979; and Section 3.1), according to Miller (1975), the oldest reconstructible stage of IE (Indo-European) may have been VSO. Miller (1975: 32) notes that in IE the productive compound type was SV, OV, but that VS, VO was archaic and residual. IE also had a marked conjunct order, with the verb at the beginning (Watkins 1963), another residue of VS order. Lehmann (1969: 12f)

to indicate that children start with the foundation, before they can build the suprastructure.

At the next stage, there is a tendency to produce compounds with misplaced affix: “dry-hairer”/“dryer-hair” (cf. the target “hair-dryer”) and “fix-biker”/“fixer-bike” (cf. “bike-fixer”). It is only later that children begin to place the noun before the verbal form, creating the adult NV-*er* order. At the very least, this finding supports the proposal that VN compounds are more primary and simpler in structure than their hierarchical counterparts, as they emerge earlier in language acquisition. Moreover, the stages and struggles in the acquisition of these compounds reinforce the conclusion that NV-*er* compounds are built upon the foundation of the paratactic VN compounds (Section 6.3).

In addition, the imperative in general is among the first productive verbal forms used by young children (Bar-Shalom and Snyder 1999). It is conceivable that the imperative is a paradigm case of an unmarked mood form, and that for that reason it emerges early, whether in evolution or acquisition. Moreover, as reported in e.g. Bates *et al.* (1979), children’s early speech acts are manipulative, expressing wishes and commands (the typical uses of optative, as per Section 6.4), while the informative (declarative) speech acts emerge later. The acquisition data are thus consistent with the view that the grammar behind VN compounds represents an evolutionary primary, foundational strategy.

In addition to language acquisition, there is some corroborating evidence from language representation in the brain. It has been reported that swearwords are processed by the more ancient structures of the brain, suggesting that they themselves might be ancient creations. According to e.g. Code (2005: 317), swearwords (as well as some other non-propositional uses of language) might represent fossilized clues to the evolutionary origins of human communication, given that their processing involves the right hemisphere, basal ganglia, thalamus, and limbic structures. Basal-limbic structures are phylogenetically old and the aspects of human communication associated with them are considered to be ancient too (e.g. van Lancker and Cummings 1999; Bradshaw 2001).³¹

Moreover, as pointed out in reference to other syntactic fossils, such as small clauses (Chapter 2) and absolutes/unaccusatives (Chapter 3), neuroimaging experiments can be devised to compare and contrast the processing of VN compounds and their hierarchical -*er* counterparts (Progovac 2010b). The prediction of the proposal

claims that these verb-initial compounds are derived from underlying sentences having the order with the verb preceding the object or subject. Perhaps (proto-)imperatives had a preference for initial verb order, and the compounds that fossilize such imperatives are verb-initial. Needless to say, resolving this issue is beyond the scope of this book. But, as pointed out in Section 4.4.5, word order in the two-word proto-syntax stage was probably not fixed.

³¹ Note also that Tourette’s Syndrome, a disorder caused by basal ganglia-limbic connection dysfunction, is characterized by involuntary production of obscene speech.

in this chapter is that the processing of VN compounds involves less syntactic activation in Broca's areas, and less lateralization in the left hemisphere, but more reliance on subcortical structures of the brain, and the right hemisphere. This would especially be the case with the compounds involving swearwords, as per the discussion above. The Appendix returns to this testing opportunity in more detail.

6.8 Concluding remarks

In conclusion, the grammar behind VN compounds is an excellent candidate for a fossil of proto-syntax, involving the simplest possible merger of a verb-like and a noun-like element. Little about these compounds makes sense except in the light of evolution. They show rudimentary syntax, defying the most fundamental postulates of modern morpho-syntax, including headedness and hierarchy. In addition, their semantics is underspecified, with no differentiation between thematic roles, and therefore between subjecthood and objecthood. Additionally, these compounds specialize for derogatory reference, which invokes an explanation in terms of ritual insult and sexual selection. Adding further to the exotic nature of VN compounds, their verb surfaces in a (proto-)imperative form in some languages.

These crude compounds, typically exhibiting the most base and basic of vocabulary, can nonetheless express abstract (human) traits not only with astounding succinctness and vividness, but also with humor and playfulness. Using this kind of compounding strategy at the dawn of language would have not only augmented the expressive power of human language enormously (Chapter 7), but it would have also provided a foundation for further vocabulary and structure building, in keeping with the main theme of this monograph.

6.9 Appendix 1: Additional English VN compounds

As names in English (most are taken from Weekley 1916)

Ben-bow (bend-bow), Bere-water (bear-water), Bran-foot (possibly from brand-foot, for animals/slaves), Break-speare, Burn-house, Catch-love (love = wolf), Cant-well, Crake-bone, Cut-bush, Cut-fox, Cut-love (love = wolf), Cut-right, Culle-hare (culle = kill), Culle-hog (culle = kill), Culle-bolloc (culle = kill), Do-best, Do-bet, Do-little, Do-well, Doubt-fire (from arch. "dout" – in charge of furnace), Dread-nought, Drink-low, Drynk-pany (drink penny), Drink-water, Eat-well, Gather-all, Gather-cole (coal or cabbage), Gather-good (good = property, wealth), Go-lightly, Hab-good (from "hap" = "to snatch"), Hack-block, Hack-wood, Hate-crist (crist = Christ), Hop (e)-well (well = stream/pool), Hurl-bat, Kill-buck (place name in the state of New York), Kis-sack, Lack-land, Lack-love, Love-gold, Love-good (probably good = God; contrast with Hate-crist), Love-well, Make-joy, Make-mead, Make-peace, Mar-brow,

Mar-wood, Mean-well, Mend-market, Pass-field, Passe-low (cross-water), Perce-forest (perce = pierce), Perce-val (pierce-vale), Pers-house (pers = pierce), Pil-beam (pil=peel, barker of trees), Pinch-back, Porte-rose, Rack-straw (rack = rake), Rid-land (rid = clear), Rid-wood (rid = clear), Save-all, Scare-devil, Scatter-good (good = wealth/property), Shake-lady, Shake-lance, Shake-rose, Shak-shaft, Shake-speare, Shake-staff, Shear-gold (coin-clipper), Shear-lock, Shear-wood, Shave-tail (shave = shove), Spare-good (good = property, wealth), Spare-water, Spin-garn, Spyll-payn, Stab-back, Stand-even, Stand-fast, Strangle-man, Swep-stak, Thack-well (thatcher), Thumb-wood (cf. *mar-wood*; “thumb” archaic for “to handle clumsily”), Tickle-penny, Tire-buck (tire = tear), Tread-away, Tread-gold, Tread-well (well = stream), Trede-water, Trust-god, Tuck-well, Turn-bull, Turn-penny, Turn-pike, Wage-spere, Wag-horn, Wag-staff, Wag-tail, Wast-all, Win-bow, Win-penny, Win-rose, Wipe-tail, Wrynge-tail

Online dictionaries of slang; dictionary.com

(It is of note here that for some of these compounds it is not possible to tell if they are VN or NN compounds.)

fuck-ass (fool), fuck-bag (disgusting person), fuck-ball, fuck-brain, fuck-buddy, fuck-a-bush, fuck-chop (an imbecile), fuck-head, fuck-dog (dog-fucker), fuck-face, fuck-freak, screw-ball, shit-ass, shit-bag, shit-bullets (terrified person; cf. Serbian *Seri-sabljić*, Appendix 2), shit-bird, shit-head, shit-face, shit-stick

6.10 Appendix 2: Additional (mostly coarse) VN compounds as Serbian people and place names (taken from Mihajlović 1992)

| | | |
|-------------|---------|--|
| Čepi-guz | IMP/3SG | ‘cork-butt’ |
| Češi-guz | IMP/3SG | ‘scratch-butt’ |
| Ćuli-brk | IMP/3SG | ‘stick-moustache’ |
| Deri-gaća | IMP | ‘rip/tear-underpants’ |
| Deri-kučka | IMP | ‘rip-bitch’ |
| Deri-muda | IMP | ‘rip-balls’ (place name, a steep hill) |
| Draži-vaška | IMP/3SG | ‘tease-louse’ |
| Gladi-kur | IMP | ‘stroke-dick’ (womanizer) |
| Gori-guzica | IMP | ‘burn-butt’ (person in trouble; cf. <i>Burn-breeches</i>) |
| Jebi-baba | IMP | ‘fuck-old.woman’ (unselective womanizer) |
| Jebi-sestra | IMP | ‘fuck-sister/cousin’ |
| Jebi-vetar | IMP | ‘fuck-wind’ (charlatan) |
| Kapi-kur | IMP | ‘drip-dick’ (name of a slow spring) |
| Kosi-noga | IMP | ‘skew-leg’ (person who limps) |
| Kovrlji-guz | IMP | ‘drag-butt’ |

| | | |
|--------------|---------|---|
| Kradi-gaća | IMP | 'steal-underpants' |
| Krpi-tur | IMP | 'patch-butt' (poor person) |
| Laj-kučka | IMP/3SG | 'bark-bitch' (loud and obnoxious person) |
| Lezi-baba | IMP/3SG | 'lie-old-woman' (loose woman or man) |
| Lezi-tetka | IMP/3SG | 'lie-aunt' (loose woman or man) |
| Liz-guz | IMP/3SG | 'lick-butt' |
| Muz-govno | IMP/3SG | 'milk-shit' |
| Nabi-guz | IMP/3SG | 'shove-butt' |
| Neper-gaća | IMP/3SG | 'no-wash-underpants' |
| Peči-govno | IMP/3SG | 'burn-shit' |
| Piš-kur | IMP/3SG | 'piss-dick' |
| Plači-guz | IMP/3SG | 'cry-butt' (cf. <i>cry-baby</i>) |
| Plači-pička | IMP | 'cry-cunt' (vulgar version of <i>cry-baby</i>) |
| Plaši-vranac | IMP/3SG | 'scare-crow' |
| Poj-kurić | IMP/3SG | 'sing-dick' (womanizer) |
| Prdi-kučka | IMP/3SG | 'fart-bitch' |
| Prdi-vuk | IMP/3SG | 'fart-wolf' |
| Prdi-zec | IMP/3SG | 'fart-rabbit' |
| Prti-mud | IMP/3SG | 'carry-balls' |
| Puš-kur | IMP/3SG | 'smoke-dick' |
| Razbi-dupe | IMP/3SG | 'break-butt' (steep terrain) |
| Seri-sabljić | IMP/3SG | 'shit-sword' |
| Seri-vuk | IMP/3SG | 'shit-wolf' |
| Visi-guz | IMP | 'hang-butt' |
| Vuci-guz | IMP | 'drag-butt' (slow-moving person) |
| Vuci-klašnja | IMP | 'drag-stockings' (carelessly dressed person) |
| Vuci-kuja | IMP | 'drag-dog' (stray dog) |

The plausibility of natural selection for syntax

“Evolution is the only physical process that can create an eye because it is the only physical process in which the criterion of being good at seeing can play a causal role”

(Pinker and Bloom 1990: 710)

7.1 Concrete and selectable advantages accrued by each stage

This chapter considers how each new postulated stage of syntax accrues concrete communicative advantage(s) over the previous stage(s), and how such advantage(s) would have been subject to natural/sexual selection. More specifically, I show how the progression from one-word stage (no syntax), to paratactic two-slot syntax (Section 7.2), to hierarchical vP/TP stage (Section 7.3), brings about clear incremental communicative benefits. Section 7.4 details one concrete hypothetical scenario for progressing from one stage to the next, invoking sexual selection. Section 7.5 considers how these syntactic stages may fit into the timeline of human evolution.

Doubt has been repeatedly expressed regarding the possibility that aspects of syntax were naturally/sexually selected. Most of the dismissive reactions mention abstract syntactic postulates such as Subjacency (Chapter 5), or EPP (requirement that every clause has a subject), pointing to the improbability of such principles being sexually selected given that even their status in syntax is not clear, let alone their usefulness to survival. As famously put by Lightfoot (1991: 69), “Subjacency has many virtues, but [...] it could not have increased the chances of having fruitful sex.”

However, as concluded in this book, phenomena associated with Subjacency are not the essence of syntax. In fact, islandhood effects are largely unexplained and poorly understood phenomena in syntax, and their characterization still remains at the level of observation and description, as discussed at length in Chapter 5. Given the framework developed in this monograph, it transpires that islandhood is in fact an epiphenomenon of evolutionary tinkering, that is, an ancient, foundational state of grammar, which does not sanction Move. To put it slightly differently, islandhood is the default state of proto-grammars, and only some relatively recent, innovative

constructions can override this default state, giving an illusion of Subjacency. On my approach, which illuminates the issue from a shifted perspective, it is the ability to use these innovative constructions, and the communicative benefits that come with them, that would have been selected, rather than Subjacency. So, in order to explore a gradualist approach to syntax, one needs to decompose syntax along dimensions which are concrete and specific enough for selection to target, and at the same time consistent with the basic theoretical postulates of syntax. This is the most important pursuit of this monograph.

Speaking in broad terms, my argument is that (more) complex syntax brings about adaptive advantages in the following ways. First, it automatizes/streamlines the expression of various syntactic phenomena, such as transitivity, tense, subordination, which can otherwise be expressed, but only vaguely and with less speed and precision (see also Pinker and Bloom 1990, among others). One rather amazing property of human language is the speed with which we can talk and understand others talking. The less we have to guess as to what goes with what, and the more we can rely on subconscious, automatic processes to arrange the basic information, the faster and more undistracted our speech will be. Syntax does its part by providing that frame which organizes the information in a reliable and predictable manner.

Second, and related to the advantage identified above, by offering more precision in expression, more complex syntax allows us to escape the vast vagueness associated with underspecified proto-grammars and to break away from the here-and-now, as well as from the prison of pragmatics more generally, enabling the famous displacement property of human language (see e.g. Hockett 1960). Third, and related to the above, given that a more complex grammar is much more self-sufficient and much less reliant on pragmatics, it is much better at expressing strange, even non-existent concepts, contributing to the capacity for novelty and creativity. Several other properties of language only emerge in the later stages of syntax, including hierarchy and the capacity for recursion. The following two sections break down these general advantages into specific ones.

7.2 From one-word to two-word utterances: Vagueness galore

A progression from one-word to two-word stage, i.e. from no syntax to rudimentary (paratactic) syntax, would have brought about enormous communicative advantages to our ancestors. While syntacticians often dismiss any precursors to complex syntax as irrelevant or even impossible, the argument that I build throughout this monograph is that this simple paratactic syntax is the foundation for any further developments with syntax, the scaffolding without which it would not have been possible to reach the complex realm.¹ As such, the emergence of productive two-slot syntax may

¹ Jackendoff (1999, 2002) also considers that previous stages of evolution, such as Bickerton's (1990) protolanguage, provided a foundation for subsequent stages. Jackendoff and Wittenberg (2014) also

have been the most dramatic breakthrough in the evolution of human language. In this section I focus on the advantages of this stage brought to light by the concrete proposals and fossil evidence discussed in this monograph, but there is no doubt that there would have been many more advantages of transitioning into a two-word stage.

Consider now some hypothetical examples that can shed light on the communicative possibilities in the one-word stage (1). One should keep in mind that one-word utterances would continue to be available in the two-word stage as well, as per the theme of this monograph that the emergence of a new stage preserves the achievements of the previous stages:

- (1) Snake! ... Gone! ... You! ... Out! ... Eve! ... Run!

The string in (1) could mean that a snake has been spotted, and that you should be gone and out, and that Eve should run, too. Or it could mean that the snake was spotted, but is now gone, thanks to you, and now Eve should go out and run. Or maybe you should run to save Eve. There are various other possibilities for (1) as well, each conveying very different messages. The one-word stage would have been frustratingly vague, at least from the point of view of the modern person. Still, at the point when first words emerged, they would have been a source of joy, a novel device for display, in addition to being somewhat informative. Darwin (1872) argued that neophilia, i.e. love of novelty, was an important factor in the diversification and rapid evolution of e.g. bird song. Primates in general are extremely neophilic, and this is certainly the case with humans. This clearly has important implications for sexual selection of language.

On the other hand, the two-word stage, as postulated in Chapters 2 to 4, would have been able to express basic intransitive (absolutive-like) propositions (or predications) by combining a verb-like and a noun-like category, as illustrated in the following examples, analyzed here as fossils of this stage:

- (2) Come winter, ... Problem solved.
- (3) Pao sneg. Stigla pošta. (Serbian)
fell._{PART} snow arrived._{PART} mail
- (4) Ayam makan (Riau Indonesian, Gil 2005)
chicken eat
'The chicken is eating.'
'Somebody is eating the chicken.'
- (5) rattle-snake, cry-baby, scare-crow, hunch-back

emphasize the layering and preservation of older stages. However, they characterize their stages and layering differently, as discussed in Section 1.6.

Early child language also abounds in two-word utterances. Consider the following hypothetical small clauses used in the two-word stage:

(6) Marie cut. Me go. Eve gone. Snake roll.

Even though two-word grammars are still quite underspecified, the vagueness is significantly reduced in comparison to the one-word stage.² Here, in the two-word stage, it is at least clear which verb is associated with which noun, and it is also typically the case that the referent of the noun is a major participant of the action specified by the verb, providing evidence of (proto-)predication, as characterized in Section 3.4.2.

If the proto-words from (6) were *not* grouped into (small) clauses (7), many more options for interpretation would be readily available, including the following one, highly unlikely for (6): “Look at Mary. She is cutting me. Go, Eve. The snake is gone. Roll now.”

(7) Marie... Cut... Me... Go... Eve... Gone... Snake... Roll...

Still, as discussed in the following section, it takes hierarchical syntax, such as vP and TP layers of structure, to unambiguously distinguish between e.g. subjects and objects. This is exactly the scenario compatible with the incremental, step-by-step evolution of syntactic complexity, in response to communicative pressures to reduce vagueness in the expression of argument structure.

There is one more characteristic that goes hand-in-hand with vagueness and reliance on context, especially when it comes to distinguishing subjects from objects. The pragmatic context can easily give a clue as to who is eating what in sentences such as (4). If we are observing a chicken walking in a yard, then the first interpretation in (4) would make sense; if we are observing a chicken on a plate, then only the second interpretation would make sense. However, the syntax of (4) on its own does not distinguish these possibilities. But notice now that by utilizing the pragmatic context we catch ourselves expecting the utterances to make pragmatic sense, to be consistent with how the world is. If so, at the postulated absolute-like stage, it would have been hard to express something very strange, or plain impossible, such as a chicken eating Tom, or an apple eating a chicken. This means that displacement, understood not only as a shift away from the here-and-now, but also as a shift away from the realm of probable or possible, would have been much harder to realize with two-slot grammars, and especially with one-word utterances, as also discussed in the following section. The property of displacement, understood in this way, would only

² It is essential to have an appropriate standard of comparison whenever we talk about adaptiveness or usefulness of syntax; that is, we need to ask the question: “more useful or more precise in comparison to what?” Likewise, when one claims that language/syntax is not good for communication, the question is again: “in comparison to what?”

flourish with the hierarchical stage, and it might have in fact been a major driving force behind the evolution of the hierarchical stage.

However, this two-word stage can already piece together a way to express transitive events. In addition to combining two words into a (small) clause, two-slot grammars can also paratactically combine two such clauses. This most probably would have been a later development, and perhaps a different sub-stage in the paratactic stage in the evolution of syntax, but it is still in essence a paratactic, symmetric stage. Recall from Chapter 3 that the earliest stages of Nicaraguan Sign Language tend to use sequences of two intransitive clauses when dealing with multiple animate arguments, such as (9) or (10), in lieu of transitive structures, such as (8) (Kegl, Senghas, and Coppola 1999: 216–17; Senghas *et al.* 1997; see also Aronoff *et al.* 2008 for Al-Sayyid Bedouin Sign Language):

- (8) *WOMAN PUSH MAN.
- (9) WOMAN PUSH—MAN REACT.
- (10) WOMAN PUSH—MAN FALL.

The paratactic binary grammar above can already express transitivity, but in a roundabout way, and not as directly and unambiguously as a true transitive sentence such as (8) would. This is exactly the claim here, that language evolved in the direction of streamlining and automatizing the expression of certain syntactic phenomena, including transitivity, starting from a stage in which such grammatical phenomena could be expressed, but only with vagueness/imprecision, and with the help of context.

One can find such binary clause fossils in a variety of languages, as discussed in Chapter 4. Most of them are used to express some temporal or causal relationships between two clauses.³

- (11) a. Come one, come all.
b. Easy come, easy go.
c. Garbage in, garbage out.
- (12) a. Wo dua, wo twa (Twi)
you sow you reap
b. Wo hwehwea, wo hu
you seek you find

The symmetrically/paratactically attached clauses above (created by the Operation Conjoin of Chapter 4) are interpreted as linked, but merely by iconic means. The

³ Thanks to Kingsley Okai (p.c. 2011) for the Twi data. See many more examples from other languages in Section 4.2.

event of the first clause is taken to precede and/or cause the event of the second clause. This is iconic because it mimics the intended ordering of the two events. Reversing the order of these clauses would completely change their meaning (e.g. ??*Easy go, easy come*; ??*You reap, you sow*). In contrast, fully fledged hierarchical counterparts are not subject to this ordering condition (e.g. *You will reap (only) if you sow*), as they rely on functional categories and syntax to express their meaning in a more self-reliant fashion. This iconicity of ordering is also relevant for the precursors to transitivity, such as (9–10). There, again, the causing event is placed before the caused event (as also discussed in Sections 3.4.1 and 1.6).

The data discussed in this section illustrate two points. First, unlike one-word grammars, two-slot paratactic grammars can express, with some consistency, elementary predication by combining e.g. a verb and a noun, as well as some temporal/causal relationships between two clauses. The two-slot grammars are thus more precise and more expressive than one-word grammars, but less precise and less expressive than hierarchical grammars, suggesting again an incremental increase in communicative capabilities, exactly the scenario in which evolutionary forces can operate.

But the communicative/expressive advantages of a two-word stage certainly do not end here. As shown in Chapter 6, exocentric VN compounds are fossil structures which specialize for derogatory reference, and which provide evidence of ritual insult/sexual selection for (simple) syntax (see Progovac and Locke 2009; Progovac 2012). While it is certainly possible to insult somebody by using single words, one's ability to create stunning insults increases by leaps and bounds if one can combine two proto-words (see Section 7.4 for a detailed evolutionary scenario).

- (13) cry-baby, busy-body, turn-coat, kill-joy, pick-pocket, fuck-head
- (14) ispi-čutura (drink.up-flask—drunkard), guli-koža (peel-skin—who rips you off), cepi-dlaka (split-hair—who splits hairs), muti-voda (muddy-water—trouble-maker), jebi-vetar (screw-wind—charlatan), vrti-guz (spin-butt—fidget); tuži-baba (whine-old.woman—tattletale) (Serbian)

The VN compound data taken from a variety of languages make it clear that these compounds typically combine basic, concrete words, often denoting body parts and functions, in order to express vivid and memorable abstract concepts. Selecting for the ability to quickly produce (and interpret) such compounds on the spot would have gone a long way toward not only solidifying the capacity to use paratactic two-slot grammars, the foundation for more complex grammars, but also the capacity for building abstract vocabulary. As discussed in Section 7.4, sexual selection for the capacity to produce and interpret such compound insults would have been *one* of the factors driving the progression from the one-word stage to the two-word paratactic stage.

In sum, having a bunch of single words to refer to individuals or actions without using syntax (one-word stage) would have already been very useful to our ancestors, much more useful than not having any words at all, but much less useful than having two-word grammars, as the latter provide clear and concrete communicative benefits. The next section considers the advantages of transitioning to the stage of hierarchical syntax.

7.3 From the two-word stage to hierarchical syntax: Evolving transitivity, displacement, and recursion

7.3.1 Introductory remarks

If my proposal in this monograph is on the right track, then some of the design features of human language, such as displacement (see e.g. Hockett 1960; Hockett and Altmann 1968), emerged through evolutionary tinkering, that is, by gradually evolving hierarchical grammars (with e.g. vPs and TPs). Such hierarchical grammars offer enough precision to be able to stand on their own, without much reliance on context, and thus to describe situations that are distant, non-existent, or that even challenge common sense. These capabilities increase significantly in the transition from the two-word stage to the hierarchical stage, given that in this stage one does not have to rely much on pragmatic context, which typically confines one to the available and the observable. Both displacement and recursion would have been very difficult to express, if possible at all, in the two-word stage, as discussed in this chapter.

My claim is thus that these amazing properties of human language did not just materialize out of thin air, but that they had to evolve through a painstaking process of scaffolding and tinkering, with two-word grammars providing the ultimate syntactic foundation. This process was guided by the evolutionary pressures to tinker with these grammars to be ever more and more expressive, ever more and more precise, and to be able to communicate more and more kinds of ideas. It must have taken constant and relentless acts of creativity and novelty on the part of our ancestors to get us where we are now. And many good hominins, with otherwise perfectly good genes, had to make room for those who happened to be just a bit better at this game.⁴

7.3.2 Grammaticalizing tense

As discussed in Chapter 4, progressing from the paratactic (two-word) stage to the hierarchical functional category stage may have proceeded through a linker/proto-conjunction stage, where the linker initially served only to solidify proto-Merge, that

⁴ More precisely, just a little bit better at whatever the local game with language was, in that particular location, at that particular time.

is, to provide more robust evidence of combinatorial syntax. Perhaps the initial meaningless linkers occurring between a subject and a predicate of a small clause, or between two clauses, gradually became tense particles, or subordinators/complementizers, enabling more automatic expression of tense/time reference, as well as subordination. Or perhaps tense markers developed from other sources, such as verbs.

Whatever the source, the emergence of the sentential functional projection such as TP renders more automatic and undistracted the expression of temporal, modal, and other properties, allowing speakers to break away from the here-and-now more easily and more efficiently. As also shown in Chapter 2, tenseless root small clauses in modern languages tend to specialize for the here-and-now, and cannot be easily modified by adverbials such as “three years ago,” either in Serbian or in English:

- (15) a. *Stigla pošta pre tri godine.
 arrived mail before three years
 b. *Pao sneg pre tri godine.
 fell snow before three years
- (16) a. *Case closed three years ago.
 b. *Me first three years ago!

This kind of specialization is possible in modern languages when they also exhibit the alternative TP strategy:

- (17) a. Pošta je stigla pre tri godine.
 mail _{AUX} arrived before three years
 b. Sneg je pao pre tri godine.
 snow _{AUX} fell before three years
- (18) a. The case was closed three years ago.
 b. I was first three years ago!

In the literature on evolution, evolving multiple means to the same end is considered to create the opportunity for the evolution of specialization through the division of labor (e.g. Carroll 2005), as pointed out in Section 2.2. The retention of these small clause fossils in the here-and-now contexts can be explained if more complex grammars do not bring about a tangible advantage in these contexts, i.e. if they are an overkill in these contexts. An example of a grammatical overkill would be to use “The point is being taken,” in lieu of “Point taken;” or Serbian “Sneg je pao” (Snow is fallen) in lieu of “Pao sneg.” Another more subtle example of a grammatical overkill would be to use Serbian “On me udara!” (He me hits), as opposed to the middle “On se udara!,” as per the discussion in Section 3.4.2. See also Du Bois (1985) for the preference to use intransitive underspecified grammars in discourse, as discussed in Section 3.5.

There are also languages across the world that do not show an obligatory grammaticalized TAM (tense/aspect/mood) system, but can optionally express the relevant temporal/modal properties through the use of adverbials (see e.g. Skou, a Papuan language, and Riau Indonesian (Gil 2014), and Tongan (Churchward 1953).⁵ Indeed, according to Gil's (2014) study based on a sample of 868 languages, 377 are categorized as having optional TAM marking, while 491 are classified as having obligatory/grammaticalized TAM marking. This shows that variation in this respect is not only possible but widely attested. This is again consistent with the gradualist approach explored here, which postulates only a paratactic, small clause foundation as the common syntactic core. Beyond the paratactic platform, languages will diverge with respect to where and what to build on top of this foundation (see Section 7.5 for more discussion).

In various other modern languages, including Russian (e.g. Pesetsky 1982) and Hebrew (Rothstein 1995), one finds mixed systems, or perhaps we should call them split systems, on analogy with the split systems attested in case marking, as discussed in the following section. In these systems the present tense in general remains unmarked, while the other tenses show obligatory TAM markings:

(19) Ivan veren. (Russian)

Ivan faithful

(20) Ivan byl veren.

Ivan was faithful

The present tense in formal semantics literature is normally characterized as "coincident with the time of the context in which the sentence is produced" (Chierchia and McConnell-Ginet 1990: 266). If so, then grammaticalizing present tense is somewhat superfluous, an overkill, as it does not bring about a clear advantage. Most importantly, this indicates that the TAM system in one single language can be split/mixed, involving either TPs or TP-less structures, with the split aligning with communicative considerations. As will be shown in Section 7.3.3, similar mixed systems exist in the realm of transitivity, the so-called split-ergative systems.

A hierarchical TP system makes it easier to express claims about the (distant) past, as well as to make future and counterfactual claims, all hallmarks of displacement. This is not to say that these notions cannot be expressed without functional categories and projections, perhaps through the use of loosely adjoined adverbs. This is only to say that functional projections such as TP facilitate a more automatic, unambiguous, and undistracted way of expressing such notions.

⁵ See also Section 2.2 for Kiparsky's (1968) claim about pre-Indo-European in this respect.

7.3.3 Grammaticalizing transitivity

Breaking away from the here-and-now, and from the prison of pragmatics in general, which is the essence of displacement, is much easier to achieve with more articulated grammars. As pointed out above, the two-word stage does not distinguish between subjects and objects, and it is typically pragmatics that sheds light on the intended meaning of the sentence in this regard. The same certainly holds of one-word “grammars.” So, imagine encountering the following one-word (21) and two-word (22) utterance sequences in the early stages of language:

(21) Apple...Eat...Go...Tom.

(22) Apple eat...Go Tom.

These kinds of utterances are much less precise (more vague) than a corresponding hierarchical sentence such as (23) below, and can receive many interpretations in addition to the one in (23):

(23) Tom will (go and) eat the apple.

But it is important to point out that the meaning that does not readily come to mind with respect to (21–22) is the one expressed in (24), even though there is nothing in the form of these utterances that would preclude that interpretation.⁶

(24) The apple will (go and) eat Tom.

This suggests that pragmatically odd (or impossible) notions can hardly be expressed without hierarchical syntax, given that simple underspecified structures are in close alliance with pragmatics. In this respect, adding a layer of transitivity makes it possible now to unambiguously make “the apple” the subject of eating a human being (24), no matter what the context is, or what common sense tells us.

As discussed in Chapter 3, there is an abundance of “fossils” of this two-slot absolutive-like stage across languages. For example, absolutive-like constructions characterize nominals, certain middle constructions, as well as certain compounds, even in nominative-accusative languages. Ergative-absolutive languages exhibit such absolutive structures in the verbal domain as well, at least in some cases, given that most of the languages classified as ergative are in fact not purely ergative, but split-ergative systems.

Certain types of splits in split ergative languages provide a compelling argument for the claim that transitivity serves to alleviate vagueness. Many split ergative languages are mixed languages in the sense that they are ergative-absolutive with

⁶ A reviewer suggests that the reading in (24) should be obtainable even from (21/22). This is something that can be subjected to psychological testing to determine the statistical likelihood of interpreting (21/22) as something pragmatically implausible, such as (24).

some types of nominals, such as inanimates, but nominative-accusative with others, such as animates (e.g. Gair 1970 for Sinhalese, a language spoken in Sri Lanka).⁷ Clearly, this kind of split aligns with communicative considerations, as the ambiguity is much more likely to arise with the animates than with the inanimates. As Tchekhoff (1973: 285) notes in connection to Tongan, “a yam cannot eat any more than a box can dig a hole.”

Consider again some hypothetical examples from the postulated absolutive-like stage:

(25) Yam eat. Tree cut. Water drink.

(26) Chicken eat. Chicken cut. Boy cut.

While there is little possibility for confusion with (25), where “yam,” “tree,” and “water” are readily interpreted as objects of the expressed actions, there is often possibility for confusion with animates (26), as they can both cut and be cut, and they can both eat and be eaten. Thus, the split in these cases is designed to reduce vagueness where it is likely to arise, as per the discussion in e.g. Comrie (1989: 124–37).

Comrie (1989: 130) in fact observes that there are some languages, such as Hua (spoken in Papua New Guinea), where the occurrence of a special transitivity marker (e.g. accusative) is “conditioned not by any specific rigid cut-off point in the animacy or definiteness hierarchies, but rather . . . [by] the assessment of likelihood of confusion,” which is left to the speaker in the particular context. This is a clear case of syntax responding to communicative considerations in modern times, which moreover illustrates exactly the kind of transitional scenario that could have paved the way toward grammaticalized transitivity. Aissen (2003) looks at a variety of languages with what she terms “differential object marking (DOM),” which include ergative/accusative splits, and concludes that DOM is a compromise between two contradictory principles, Iconicity and Economy. For her, Iconicity is at work when overt case marking occurs on an object which can easily be confused for a subject, while Economy simply avoids any case marking.

⁷ The animacy scale that these processes typically target can be expressed as:

(i) Human > Animate > Inanimate (see e.g. Silverstein 1976; Aissen 2003)

Another dimension along which case marking can split is definiteness (Aissen 2003). As reported in e.g. Dixon (1994), in the Australian language Dyirbal, pronouns denoting first and second person adopt the nominative-accusative pattern, while the rest of the nominals, those lower on the animacy/definiteness hierarchies, adopt an ergative-absolutive pattern.

There are various other kinds of ergative/accusative splits, including those which are based on aspect. A discussion of these is outside the scope of this monograph. My goal here is simply to show that there exist ergative/accusative splits which clearly align with communicative considerations. I am not claiming that all splits necessarily do.

Recall from Section 7.3.2 that in mixed/split TAM systems, present tense usually remains unmarked, possibly TP-less, as it is the context in which more complex TP marking does not bring about a tangible advantage. The same considerations hold in the realm of transitivity in this case: simpler, vP-less structures are used in those (typically inanimate) contexts in which more complex vP structures yield no significant communicative advantage. This ties in well with one of the themes of this book, that simpler, fossil structures co-exist with more complex structures because they are more economical, and because there are many situations in which more complex structures are just an overkill.

The DOM marking discussed above is also found in nominative-accusative languages. As pointed out in e.g. Comrie (1989: 132) and Gil (2014), in languages in which accusative marking is optional, it typically occurs on animate and/or definite nouns, but not on inanimates, as illustrated below for Spanish and Serbian:

(27) El hombre vio a la mujer. (Spanish)
 the man saw ACC the woman

(28) El hombre vio la silla
 the man saw the chair

(29) Milan donosi jež-a. (Serbian)
 Milan brings hedgehog.ACC
 ‘Milan is bringing a hedgehog.’

(30) Milan donosi Jež.
 Milan brings hedgehog
 ‘Milan is bringing (the magazine called) *Jež*.’

This leaves enough room for the view that the key syntactic properties, including transitivity and Tense/TP, emerged for communication purposes, and gradually so. This is not consistent, however, with the view that syntax in all its complexity, arose only once, as a single event, shortly before the *H. sapiens*’ dispersion out of Africa (e.g. Chomsky 2005; Berwick and Chomsky 2011), as discussed in Section 7.5. Neither is this consistent with the concomitant view that communicative considerations cannot have anything to do with (the emergence of) syntax.

A reviewer suggests that the saltationist view mentioned above does not necessarily exclude the possibility that vP, TP, and CP emerged later through grammaticalization processes, and that what emerged as a single mutation were the “design features” of language, such as Merge, Move, recursion. However, as I have argued, these design features of syntax cannot be there without the functional categories in question. If the whole package of syntax emerged as one single event, as per saltationist claims, then this package would have certainly included the functional projections/categories, as they are the postulates of syntax upon which all the other postulates rest. Take away

vP, TP, CP, DP, and other functional categories, and you get pretty much what I have reconstructed here, a precursor to language operating with short (and flat) small clauses, with hardly any syntax to speak of (see Section 1.1 for Berwick and Chomsky's 2011 view about precursors; also Section 1.6). But, much more importantly, one should not be second-guessing what these saltationists might have had in mind, or what they might have in mind in the future. If somebody is proposing something, then they should make their proposal fully explicit, as well as understandable and vulnerable to verification.

The reviewer further suggests that communicative considerations can play some role in Chomsky's (2010) and Berwick and Chomsky's (2011) view as well, even though their view is that language emerged (in full) to facilitate thought (inner speech), rather than communication; once this thought system was externalized (e.g. pronounced), then it could have proved useful for communication as well. More precisely, according to Berwick and Chomsky (40-1), "in the very recent past, maybe about 75,000 years ago, . . . an individual . . . underwent a minor mutation that provided the operation Merge," which brought about recursive structured thought. It was at some later stage that the language of thought was connected to the external speech, "quite possibly a task that involves no evolution at all."

However, what I have proposed in this book is not just that once language in its full complexity arose (for some other purpose), it so happened that it was also useful for communication. My proposal here and elsewhere is that communication pressures were the very reason why language evolved. These communication considerations shaped the very design of human language, and determined each incremental step of its evolution. Furthermore, on my approach, each new stage relies heavily on the previous stage, and the innovations it introduces are small and incremental, so that they can be understood and negotiated by the rest of the community as soon as they arise. This incremental approach removes any rationale for the claim that language could not have evolved for communication purposes.⁸

Going back to the communicative benefits of the vP/TP equipped syntax, it is useful to recall that, the more vague the expression, the more it relies on the pragmatic context and on pragmatic plausibility in general, because of our tendency to seek pragmatic sense. In contrast, more complex language/syntax is better able to take us away from the concrete and observable in the here-and-now, toward what is less concrete, and less observable, and ultimately to what is non-existent or plain

⁸ As for Berwick and Chomsky (2011), one reason for their proposal that syntax and Merge were initially useful only for thought, but not for communication, has to do with that one person in their evolutionary scenario who got the language mutation. Their argument is that this one single person would not have had anybody to communicate with, and that communication could start only much later, after this mutation was passed down through several generations. This kind of conundrum only arises if you insist that language/syntax arose as one single event/mutation, but not if you envision an incremental, gradualist approach, with precursors, as discussed in the preceding and following sections of this chapter.

bizarre. While our ability to talk nonsense is clearly not always advantageous, one would have to concede that it makes it easier to talk about things that do not exist, but that might have existed, or might exist in the future. It is easier to describe a different world, and then perhaps to change the world so it fits this new description. Or, if one is skeptical about displacement being adaptive in this way, there certainly remains the great potential for using language to amuse and surprise, i.e. for display purposes.

In other words, the evolutionary pressures to proceed to a transitive (hierarchical) stage would have included the following tangible benefits: (i) more precision in the expression of argument structure; which in turn leads to (ii) capacity for displacement, not only in the sense of temporally/spatially removed (relevant also for TP), but also removed from the ordinary, common sense, or plausible; which in turn opens doors to (iii) the capacity to tell amazing and entertaining stories; or just to (iv) stun and amuse with novel and fantastic claims. Again, it is entirely possible that those who were just a bit more creative with using language in these ways left more offspring than the rest, leading to the spread of this capacity. As pointed out in e.g. Tallerman (2013b: 95), even in modern societies the most eloquent speakers tend to be granted the highest status, which in turn is correlated with greater reproductive success (e.g. Locke 2009 and references there). In this respect, Miller (2000: 350) points out that the speaker benefits much more from holding the floor, than the hearer benefits from listening.

7.3.4 Recursion

As argued in Chapters 2, 3, and 4, it is only in the hierarchical stage that true recursion becomes available, making it possible to embed, repeatedly, e.g. one point of view within another.⁹ Recall that fossil structures, such as tenseless root small clauses in English (31) and Serbian (32), cannot embed at all, in contrast to full finite CPs (33, 36), which show infinite recursion:

- (31) *Him worry [me first]? *Him happy [problem solved]?
- (32) *Ja mislim [(da) stigla pošta].
I think (that) arrived mail
- (33) Ja mislim [da ti znaš [da je stigla pošta].
I think that you know that AUX arrived mail

As pointed out in Chapter 4, full CP structure, with a designated complementizer, may be necessary to realize the full (unlimited) recursion potential in the clausal domain.

⁹ As pointed out in the previous chapters, I adopt the typical, standard characterization of recursion in linguistics, according to which recursion refers to the ability to repeatedly embed/insert one type of category (e.g. a CP or a DP), *within* another category *of the same type* (for a detailed discussion of this, see Section 4.4).

As shown in detail in Section 4.4, it is possible to identify, by looking at the three strategies for syntactic integration, a gradual progression toward achieving unlimited recursion. While parataxis already allows the interpretation of one view embedded within another (34), and coordination may allow two such levels of embedding, with some special tinkering (35), it is only subordination, with a designated functional projection, that can achieve unlimited recursion (36). In that sense, parataxis and coordination provide excellent precursors to CP recursion (Bouchard 2013: 60 also observes that parataxis is an alternative way of expressing what subordination does).

- (34) a. [?]Marc is a linguist—[you know,] [Mary knows].
b. Marc is a linguist—[you know it,] [Mary knows it].
- (35) Marc is a linguist, [and you know it,] [and Mary knows that].
- (36) You know [_{CP} that Mary knows [_{CP} that Marc is a linguist]].

As pointed out in Chapter 4, it seems that all hierarchical phenomena considered in this book, including subordination and transitivity, have alternative routes, involving non-hierarchical, paratactic structures. This is consistent with the proposal in this book that parataxis provides a precursor, a foundation for building hierarchical structures.

Going back to the paratactic example in (34), the clauses in it should be analyzed as occurring next to each other, loosely Conjoined, in the sense of iteration, rather than true recursion (Kinsella 2009, Section 4.4). The nature of the semantic link between the clauses will then be figured out pragmatically. Perhaps one way to implement this distinction is to consider that a specific functional category, such as CP (36), is processed in a direct, streamlined way by the specialized syntactic areas in the brain, such as Broca's area. On the other hand, Conjoin (responsible for parataxis) may be delegated to more general and more scattered processing strategies, which work quite well when only two elements are Conjoined, but which are challenged when multiple combinations are attempted, as is the case with e.g. *No come, no money, no shelter*, as discussed earlier (see Sections 3.1 and 4.4.2).

This is again exactly what evolutionary forces can operate upon: there is already a precursor to recursion, that is, a precursor to the ability to embed one viewpoint within another, but it is only good for one or two levels of such embedding. In contrast, CP subordination, which specializes for this kind of embedding, gives rise to unlimited recursion. With CP subordination, unlike with coordination or parataxis, you do not need to figure out and guess what various pieces might or might not be referring to—the syntax gives you no choice but to interpret each CP as embedded within the higher CP. It is a fool-proof strategy. This is the sense in which gradual, step-by-step, evolution should be understood: a new stage does not bring about something totally new, but something just a bit more streamlined.

This also goes a long way toward answering some more general questions that linguists sometimes pose, as discussed briefly in Section 7.3.3. For example, a reviewer wonders how an innovation gets to be received or interpreted by the rest of the community. In other words, how do the listeners know that the speaker is using vP transitivity or CP recursion, if they themselves do not have it (yet)? As proposed in Chapter 3, transitivity is something that also emerges gradually, step by step, and there are precursors to it, so that the listeners are prepared to recognize when a more streamlined expression of transitivity is being presented.¹⁰ As shown above (as well as in Chapter 4), the same is true for the emergence of CP recursion—the precursors are already in place, and nothing totally new is being introduced. That is in fact a powerful argument in favor of the claim that the evolution of language had to proceed in small increments, so that something that is already available in one stage can become just a bit more streamlined and unambiguous in the next. While the issue raised by the reviewer poses a problem for saltationist accounts (see Footnote 8 for the saltationist response to this question), the gradualist approaches to evolution in general are designed to address exactly these types of concerns.

One also must keep in mind that evolution is not a predestined or predetermined course of progression to ever higher and brighter realms. It is full of random twists and turns, and full of attempts and failures (see Section 7.3.5 for some discussion). In other words, it is not that the transitive stage emerges as soon as one person utters a verb, a subject, and an object in one breath. Many conditions have to be met for a community of speakers to converge on an innovation like that, and even when all such conditions are met, it is still up to chance whether the innovation will take hold or not. But this is also the case with grammaticalization processes that take place in modern times. Also, as discussed in Chapter 3, there exist different solutions to the problem of transitivity, not just one perfect solution.

The same goes for CP and other types of recursion. Modern languages that do not make use of finite subordination have been reported to exist today (see e.g. Dixon 1995 for Dyirbal; Mithun 1984, 2010, for various Native American languages; Everett 2005 for Pirahã). As pointed out in Chapter 4, languages like German and Serbian do not exhibit DP recursion with possessives, of the kind illustrated below for English:

(37) John's mother's friend's kitten

It follows that recursion cannot be the defining property of human language, or an automatic consequence of Merge, as it is perfectly possible to have coherent grammars which make use of Merge, but which do not show recursion. Moreover, as seen in the previous sections, it is also possible to have coherent (even if underspecified) grammars without a vP or TP layer.

¹⁰ The use of the term “precursor” here is not meant to suggest that this is some kind of unstable structure awaiting further evolution. These can be perfectly stable and persistent structures by themselves. They are only seen as precursors from the perspective of transitive structures.

Finally, taking into account everything that has been discussed so far, it seems that what needed to evolve through selection/adaptation when it comes to syntax, was, first of all, fluency in the paratactic (flat) stage (Section 7.2), and then the hierarchical stage (Sections 7.3.2 and 7.3.3), with a vP, TP, or an equivalent functional projection. These two transitions would have constituted truly significant breakthroughs in the evolution of human language. This does not necessarily mean that the addition of yet another functional layer on top of this, such as CP, had to have involved natural selection. Once the brain (and language) evolved sufficiently to be able to support two or three levels of hierarchical layering, it may be that after that the third or fourth layer of structure would have been accommodated with the existing capabilities.¹¹ The next section discusses this.

7.3.5 *Historical change vs. language evolution*

First of all, it is maintained in e.g. Hurford (1990) and Fitch (2008, and references cited there) that historical change is relevant for language evolution. Fitch (2008: 483) points out that, for example, the historical loss of tone is relevant for evolutionary considerations because it proves that such a change is possible in principle. Even if that were all there is to it, historical change can at least provide corroborating evidence for specific evolutionary proposals, such as the ones explored in this book.

However, the reviewers wonder how one can distinguish between just historical change and language evolution regarding the postulated stages of language evolution. Historical change is typically considered to be a change which has no genetic basis or consequences. In contrast, language evolution (and evolution in general) is typically associated with genetic changes and selection. However, these two processes may not be as disjointed as one typically considers them to be. Let us look at one concrete, although completely hypothetical, scenario suggesting how this distinction between historical change and genetic evolution can get blurred.

Suppose we are in a community of speakers of a tone language, which is undergoing a (historical?) change to a non-tone language, i.e., it is losing its tones.¹² I have chosen to discuss tone here because it has already been discussed in the context of genetics, and because it seems easier to imagine selection for tone.¹³ Still, the same

¹¹ As discussed in the Appendix, several neuro-linguistic studies on syntax found that more hierarchical layering involves more activation in the brain.

¹² Very roughly speaking, tone can be characterized as the use of pitch (high, low, or contours thereof) to distinguish not only the meaning of words, but also grammatical categories (e.g. Yip 2002). Some languages, e.g. Bantu, use tone to distinguish tense categories. It is also of relevance here that the historical change affecting tone typically goes in the direction of tone loss, rather than the development of tone (see also Fitch 2010: 483, quoting Jespersen 1922). One salient example of such change is the recent loss of tone in Swahili, a Bantu language.

¹³ For example, the papers by Dediu and Ladd (2007) and Dediu (2008) have reported that there is a small genetic difference between populations speaking tone languages vs. those speaking non-tone languages. Their particular take on this is that the new gene variants provide a small bias toward learning a non-tone language, and against learning a tone language (but see e.g. Diller and Cann 2012 for criticism).

logic could apply to any other historical change. For concreteness, let us say that this community has 1,000 speakers. Suppose now that the large majority of this population, say 90%, has a good genetic basis for learning and using tone, that is, for quickly and effortlessly producing and discriminating the distinctions made by tone. Suppose next that the rest 10% are still fluent and functional speakers, but have something of a speech impediment, which is observable in their less than optimal use of tone.¹⁴ Perhaps they speak in a hard-to-understand monotone. As pointed out to me by Haiyong Liu (p.c. 2014), in Mandarin Chinese, a tonal language, there is a special term for good speakers, which has to do with how dramatically they make the tone distinctions: *die dang qi fu* (lit. up-down, fall-rise).

Going back to the hypothetical scenario, suppose now that those individuals who speak in a monotone, or exhibit other imperfections with their use of tone, may not have inherited all the genetic basis necessary for streamlined processing of tone, but managed to survive anyway perhaps because they were fit in other ways. Perhaps they were stronger or more attractive than most other people. The reason why such a high number, 90% of the population, got to have this genetic basis for tone, presumably gained by natural/sexual selection, would attest to the obsession that humans seem to have with “perfect” use of language, which often trumps other desirable traits.

But now suppose that tone is lost in this community of speakers—a historical change has occurred. People who are perfect at it no longer hold an advantage over those who are not. To use the terminology from Deacon (2003) (see Section 7.5.1), the genetic basis for being good at tone is now masked; that is, it is no longer accessible to selection processes, because it is no longer observable. This means that the tone-challenged 10% are no longer at a disadvantage, and that the tone-savvy 90% are no longer at an advantage. In fact, the opposite may now be true, because those 10% who managed to survive in spite of being tone-challenged may be more attractive or healthier people in general. Suppose now that after many, many generations the pendulum starts to swing in favor of the 10%, and the population now becomes say 70% tone-challenged, losing the genetic basis that was originally selected for tone. This would essentially constitute a genetic change that is inextricably linked to a historical change.

But this genetic change is not something that would be readily observable. While we would observe the historical change, we would not necessarily observe any genetic change associated with it. And if this new hypothetical generation, which is now only

¹⁴ See e.g. Wong *et al.* (2009) and Nan, Sun, and Peretz (2010) for some discussion of tone and language disorders, still a largely unexplored topic. The reader should keep in mind that the scenario I am considering here is purely hypothetical, and is not meant to make any specific claims either about tone disorders or the consequences of tone loss.

30% tone-ready, were to acquire tone again (an unlikely scenario), the pendulum may swing back again. But, crucially, I do not see how one can *guarantee* that natural selection, including sexual selection, would not operate in such cases. As Fitch (2008: 522) puts it, “language change does not entail a cessation of selection.”

This hypothetical example can also help illustrate what I mean in this book by evolution of syntax via natural selection. It is not some kind of straightforward progression toward a clearly defined lofty goal, but rather it involves just small and random local advantages, in competition with a host of other potential advantages, which can swing back and forth. It is only in hindsight, and only by sifting through a lot of variation, and a lot of twists and turns, that one can even discern a pattern, if a pattern emerges at all. Evolution in this sense is as much about loss as it is about gain.

In this respect, since I already got off track, perhaps one more (hypothetical) observation is in order. If my reconstruction of proto-syntax is on the right track, and if there was a paratactic stage in language evolution, perhaps lasting for a prolonged period of time, then I would say that our ancestors at that point got to be really good and creative with this paratactic language, including with VN compounding (*cry-baby*, *rattle-snake*), and with AB-AC patterns (*Easy come, easy go*), which may or may not have been accompanied by melodies (Sections 2.4. and 4.2). But very few of us living today seem to be still capable of using language in such creative, poetic ways. It could be that by going grammatical, and by becoming slaves to a host of tiny grammatical categories and distinctions, we masked our other great abilities, including poetic and possibly musical abilities, which then gradually got diminished, in a scenario similar to the one described above.

Those few who are still capable of such artistic expression may be considered as great orators in some cultures, as seems to be the case with skilled Hmong shamans and preachers, whose productive use of lofty AB AC patterns is highly valued (Martha Ratliff, p.c. 2013). It is also reported in Maxwell and Hill (2006: 25) that Maya writings have long shown parallelism in structure, but that such parallelism in modern spoken language only appears in most formal genres, particularly public prayer (see Section 4.2).

In any event, my proposal is that the stages of syntax, as postulated in this book, brought about incremental advantages one over the other, the advantages that could have, in principle, been subject to selection. Not all of them had to be, of course. This is an open empirical question that nowadays can be subjected to genetic and other types of testing.¹⁵

¹⁵ According to Christiansen and Chater (2008), human genome-wide scans have revealed evidence of recent positive selection for more than 250 genes (Voight, Kudaravalli, Wen, and Pritchard 2006), making it possible that there exist genetic adaptations for language.

7.4 A detailed selection scenario

For the sake of concreteness, this section describes in detail *one* possible scenario for how the capacity for the simplest two-word paratactic syntax could have been subject to selection, the kind of syntax that, according to this book, provided a foundation for all subsequent structure building. While this book discusses various fossils of this stage of grammar, and any of them could be used for illustration purposes, VN exocentric compounds are particularly illustrative in this respect, given that they rely on the basic, concrete vocabulary to create abstract concepts, and given that they specialize for naming and derogatory reference (insults), while at the same time clearly exhibiting the properties of the two-slot paratactic grammar (Chapter 6). The goal of this section is to envision how the ability to coin such insults on the spot would have secured survival benefits in the ancient times. Needless to say, this is a hypothetical scenario. But I believe that it is important to get very specific about the details of one's proposal in order to make sure that the implementation is at least in principle plausible. The significance of these compounds is exactly in that they make this particular selection scenario plausible from the point of view of evolutionary biology.

Imagine, if only for the sake of argument, that we encounter a community of hominin ancestors, such as perhaps the *H. erectus* (see Section 7.5), living in a society of about 100, with approximately equal number of males and females. The adults in this community do not divide neatly into couples, but rather some males (and females) mate with multiple partners. This is not a far-fetched scenario, given that polygamy is practiced even in the modern times, by humans and non-humans alike (see e.g. Symons 1979). In this kind of situation, if the males with certain proto-syntax capabilities left more offspring than the other males, consistently, over generations, then they would have skewed the course of evolution toward the spread of the mutation(s) responsible for that ability to the rest of the population. As discussed in Section 7.5.1, the speed of the spread depends on how high the fitness of these individuals was relative to the competitors. According to Stone and Lurquin (2007), if relative fitness is high, the increase of the variant in the population can be fast, taking just a few dozen of generations for the variant frequency to increase tenfold.

Suppose now that at this point the vast majority of the population are only capable of one-word utterances (pre-syntactic stage). Moreover, the words they use are basic and concrete, numbering in dozens, perhaps up to 200 (see the examples in (38) and (39) as a possible sample). This is the kind of protolanguage that primates such as Kanzi, a bonobo, seem capable of (see e.g. Savage-Rumbaugh and Lewin 1994). Anticipating the argument below, most of these words, nouns and verbs, are taken from the VN compounds discussed in Chapter 6.¹⁶

¹⁶ Recall also that Heine and Kuteva's (2007) reconstruction of proto-categories based on the theory of grammaticalization leads to the conclusion that the first proto-words in the evolution of language were

(38) Verb-like proto-words

break, burn, burst, crack, cry, cut, drag, drink, drip, eat, fart, fill, fold, fuck, hang, heck, hunch, kill, lick, lie, peck, pierce, pinch, piss, rattle, rip, roll, run, scatter, scrape, scratch, shake, shit, shove, skew, sing, sit, smoke, spin, spit, split, stink, stroke, suck, sulk, tread, tumble, turn, wag, wipe

(39) Noun-like proto-words

ass, baby, back, balls, beard, belly, bird, brain, butt, dung, face, finger, fire, hair, head, heel, leg, mustache, neck, old-woman, penis, shit, skin, sky, snake, sun, tail, throat, vagina, water, wind, wolf, wood

Suppose now that an innovation occurs in the community: one or two hominins begin to merge these proto-words to create insults that succinctly characterize their rivals in derogatory terms. While it would have no doubt been possible to insult with single words, in a one-word stage one is severely limited to insults such as:

(40) ass, fart, old.woman, penis, piss, shit, snake, spit, stink, vagina

Now compare this one-word potential for insult with the possibilities that open up in the paratactic two-slot stage (see Chapter 6 for many more examples from a variety of languages):¹⁷

(41) kill-joy, turn-skin (cf. turn-coat), hunch-back, wag-tail, tattle-tale, scatter-brain, cut-throat, mar-wood (bad carpenter), heck-wood, busy-body, cry-baby, break-back, catch-fly (plant), cut-finger (plant), fill-belly (glutton), lick-spit, pinch-back (miser), shuffle-wing (bird), skin-flint (miser), spit-fire, swish-tail (bird), tangle-foot (whiskey), tumble-dung (insect), bere-water (bear-water), crake-bone (crack-bone), drink-water, shave-tail (shove-tail), wipe-tail, wrynge-tail, fuck-ass, fuck-head, shit-ass, shit-head

(42) cepi-dlaka 'split-hair' (hair-splitter); guli-koža 'peel-skin' (who rips you off); vrti-guz 'spin-butt' (restless person, fidget); muti-voda 'muddy-water' (trouble-maker); jebi-vetar 'screw-wind'

noun-like and verb-like. In this respect as well, VN compounds count as good fossils, and a good starting point for breaking into paratactic syntax. It is important to clarify here, however, that in this stage one can only speak of proto-verbs (denoting actions, perhaps proto-imperative forms) and proto-nouns (denoting static individuals). There is no claim here to the effect that nouns and verbs were distinguished morphologically at this stage.

¹⁷ When such combinations are used to name animals or plants, unsurprisingly, they are not insults.

(charlatan); vuci-guz ‘drag-butt’ (slow-moving person); gori-guzica ‘burn-butt’ (a person in trouble, burn-breeches); kosi-noga ‘skew-leg’ (person who limps); lezi-baba ‘lie-old.woman’ (loose woman or man); jedi-vek, ‘eat-life’ (one who constantly annoys); kljuj-drvo ‘peck-wood’ (wood-pecker); podvi-rep ‘fold-tail’ (one who is crestfallen); čepi-guz ‘cork-butt; češi-guz ‘scratch-butt;’ deri-muda ‘rip-balls’ (place name, a steep hill); gladi-kur ‘stroke-dick’ (womanizer); jebi-baba ‘fuck-old.woman’ (unselective womanizer); kapi-kur ‘drip-dick’ (name of a slow water spring); kovrlji-guz ‘drag-butt;’ liz-guz ‘lick-butt;’ nabi-guz ‘shove-butt;’ peči-govno ‘burn-shit;’ piš-kur ‘piss-dick;’ plači-guz ‘cry-butt’ (cf. cry-baby); plači-pička ‘cry-cunt’ (vulgar version of cry-baby); poj-kurić ‘sing-dick’ (womanizer); puš-kur ‘smoke-dick;’ razbi-dupe ‘break-butt’ (steep terrain); seri-vuk ‘shit-wolf;’ visi-guz ‘hang-butt’

One goes from being able to utter a handful of very predictable and boring insults, to suddenly having the power to create many more novel insults, abstract, witty, and often humorous, combinations of words that have never been heard before. You are suddenly able to capture a trait of a person, or perhaps his essence, with only two basic proto-words. Maybe you first stumbled upon one or two combinations like this, but then you started to actively seek new ones.

According to Progovac and Locke (2009), coining compounds akin to the ones illustrated above would have been an adaptive way to compete for status and sex in ancient times. Their successful use would have enhanced relative status first by derogating existing rivals and placing prospective rivals on notice, and second by demonstrating verbal skills and quick-wittedness. Darwin (1874) identified two distinct kinds of sexual selection, aggressive rivalry and mate choice (see also Miller 2000), both of which seem relevant for the proposed use of exocentric compounds.¹⁸ There is no doubt that this ability would have attracted attention. Insult and ritual insult still do, even in the present times.

It should be noted that considering the simpler stages of grammar helps identify some potential points of continuity with animal communication abilities. As observed in e.g. Darwin (1874), the males of almost all the mammal species use their voices much more during the breeding season, and some are absolutely mute except at this season. If human language was used for display purposes from the very start, then there is some continuity there.¹⁹ In addition, compounds used for insult

¹⁸ See Section 6.6 for Darwin’s (1872) suggestion that strong emotions expressed in animals are those of lust and hostility, and that they may have been the first verbal threats and intimidations uttered by humans.

¹⁹ Darwin’s view in fact was that language evolved gradually through sexual selection, as an instinct to acquire a particular method of verbal display similar to music (see e.g. Fitch 2010 for recent arguments for musical protolanguage; see Sections 2.4 and 4.2).

often feature swearwords. Code (2005, and references there) provides neurological evidence that swearwords are separately stored from the other words, using both the part of the brain where digital language is processed, and the part of the brain which processes laughing and crying. In that sense, swearwords straddle the boundary between (animal) calls, which share many properties with laughing and crying, on the one hand, and digital language, on the other (see e.g. Burling 2005; see also the Appendix for more discussion on this).

In general, decomposing syntax into evolutionary primitives in this way has an added bonus in that it can reveal some continuity, some points of contact, between human language and other animal communication systems. Recall from Section 7.3.2 (also Chapter 2) that the paratactic (two-slot) syntax is tied to the here-and-now, and does not show displacement or recursion. These properties are also difficult to find across animal communication systems.

Let us now go back to the concrete scenario involving VN insults and our hominin ancestors. Perhaps after a day of gathering and/or hunting, as well as evading predators, the community would come together for some socializing. The group would have been thoroughly entertained by the ability to use words in novel and playful ways. Suppose for concreteness that those few men who could quickly and efficiently coin VN-type compounds on the spot had a preexisting mutation that makes this task easier for them.²⁰ They can do it with less effort and with more buoyancy. If the chances of these compound-savvy men of having fruitful sex was only 2–3% higher than for the rest, then it would have taken less than 10,000 years to spread this mutation to the rest of the population (see Section 7.5.1 for some calculations). As pointed out in e.g. Symons (1979), tribal chiefs are often both gifted orators and highly polygynous. Consider that the *H. erectus* species existed for more than a million and a half years. But notice that this would have allowed enough time for syntax to evolve even if the paratactic stage emerged with the *H. heidelbergensis* species (see Section 3.5).

It is not my intention here to suggest that (paratactic) syntax evolved only, or even primarily, for insult purposes. My intention is only to show that insults could have played an important role in solidifying basic syntax. There is no doubt that the ability to join words would have opened up many other communicative possibilities, including the accumulation of (complex) vocabulary items. For example, compound words could now be used to distinguish snakes (e.g. rattle-snake), to name animals (e.g. swish-tail (bird), tumble-dung (insect)), as well as to describe people's activities and issue more specific (less vague) commands:

²⁰ This ability may be attributable not just to one mutation, but perhaps a cluster of mutations, in which case the selection would have targeted the whole cluster.

(43) Kill snake! Eat berry! Cut wolf! Sing baby! Run wolf! Rattle snake!²¹

Intriguingly, as discussed at length in Chapter 6, VN compounds across languages seem to preserve traces of an imperative verb form.

The possibility that sexual selection played some role in evolving syntax is consistent with the findings reported in e.g. Ullman (2008) that there is a gender difference when it comes to relying on declarative vs. procedural memory in language processing (see also Pinker and Ullman 2002).²² At the same time, as noted in e.g. Darwin (1874), the law of the equal transmission of characters to both sexes prevails with mammals, and ensures that characters of all kinds are inherited equally by the males and females; we might therefore expect that with mankind any characters gained by the females or by the males, through sexual selection, would commonly be transferred to the offspring of both sexes. In other words, one would expect any differences between sexes (sexual dimorphism) to be minor and subtle.

Finally, as Pinker and Bloom (1990) argue persuasively, human language is too complicated and too specifically designed for communication to be a spandrel or a by-product of some other development.²³ The only way for a complex design such as human language to evolve is through a sequence of mutations with small effects, and through intermediate stages, with each stage useful enough and small enough in triggering natural selection. Based on syntactic theory and linguistic fossils, this monograph has reconstructed just such concrete intermediate stages of syntax through which language evolution would have passed, and identified specific communicative benefits that each stage brought about, sufficient to trigger natural/sexual selection.²⁴

²¹ Interestingly, imperatives themselves can be quite vague. While in modern languages we often distinguish the noun in *Kill wolf* as an object of the action, and the nouns in *Run wolf!* and *Cry baby!* as vocatives (thus subjects of the actions), without specific case markings for these categories, these structures are ambiguous. *Rattle snake!* could in principle either be a (bizarre) command for a snake to rattle, or a command for somebody to rattle a snake.

²² It has also been reported by many that the use of cursing and dirty words is more common in males (e.g. Jay 1980, 1995; van Lancker and Cummings 1999), and this is true even in language disorders (Code 1982). As Code observes, such words are used for fundamental expression of deep emotion, including fear, pain, frustration, as well as for sex and violence.

²³ Gould (1987) and Chomsky (2002, 2005), among others, have claimed that human language/grammar can be a by-product of other phenomena, such as the increase in brain size, or general laws of physics. Chomsky's arguments have to do with his views that syntax is not decomposable into stages, and that there are no genetic differences among humans when it comes to language abilities (Chomsky 2002: 147). Additionally, Chomsky (2002) considers that natural selection is messy and not properly understood. He also considers that the evolutionary explanations that invoke natural selection via tinkering can be symptomatic of the lack of understanding ("if you take a look at anything that you don't understand, it's going to look like tinkering" (139)), and that when things are properly understood, one realizes that there is much more order in nature.

²⁴ As pointed out by a reviewer, Pinker and Bloom's (1990) approach has been criticized on the account of the claim that the properties considered to be adaptive in language, such as recursive Merge, are not complex, and vice versa (see e.g. Pesetsky and Block 1990). My approach shows that, when syntax is decomposed into plausible evolutionary stages, this criticism dissipates. Interestingly, Pesetsky and Block

The following section considers how these stages might map onto the human line of descent.

7.5 The timeline for the evolution of language

7.5.1 *Was there enough time?*

Many evolutionists have adopted the Baldwin Effect as an evolutionary force, including Dawkins (1999). Pinker and Bloom (1990); Deacon (1997); and Briscoe (e.g. 2000) have applied it to language evolution. According to Pinker and Bloom (1990) this is a process whereby environmentally-induced responses set up selection pressures for such responses to become innate, triggering conventional Darwinian evolution (see also Deacon 1997; Hinton and Nowlan 1987).

As pointed out by Depew (2003), there is a variety of shifting and contested theoretical ideas associated with the Baldwin Effect (see also Longa 2006). What they all seem to have in common may be just the following: “learned behaviors can affect the direction and rate of evolutionary change by natural selection” (Depew 2003: 3). This may lead to converting learned behaviors into genetic adaptations, or, alternatively, it may lead to supporting learned behaviors by related genetic adaptations (Depew 2003: 3).

Deacon (2003) considers that masking and unmasking of “preadaptations” plays an important role. As language became more and more essential to successful reproduction, “novel selection pressures unmasked selection on previously ‘neutral’ variants and created advantages for certain classes of mutations that might not otherwise have been favored” (93–94). At the same time, this innovative tool “masked selection on traits made less vital by being supplemented” by the innovative tool, such as perhaps the inventory and specificity of human calls (94) (see Section 7.3.5 for a hypothetical scenario along these lines). It is important to point out that the process of unmasking can have “highly distributed parallel synergistic consequences, with the potential to significantly amplify adaptations” (Deacon 2003: 95–6). As Deacon clarifies in the postscript to his paper, his approach does not really deviate from Darwin’s, given that the unmasking process is comparable to uncovering the so-called preadaptations, associated with Darwinian evolution, or changes of function (Godfrey-Smith, Dennett, and Deacon 2003: 110).

One example that is often associated with the Baldwin Effect is the emergence of lactose tolerance among herding populations (but see Depew 2003: 26 for the claim that “there is no theory neutral empirical phenomenon that can be named ‘the

(1990: 751) challenge Pinker and Bloom to explain why it is adaptive to allow “the city’s destruction by the enemy” but not “the city’s sight by the enemy,” which, as they say, is not fully acceptable. Ironically, examples like these turn out to be relevant for evolutionary considerations, even though, of course, at a much more abstract level, as discussed in Section 3.3.4.1.

Baldwin Effect.’)” As discussed in Deacon (1997), in these populations, alleles that allow infants to digest milk are not shut down immediately after weaning, but instead remain operative at increasingly deferred points in the life cycle. While this eventually reduces to classical Darwinian selection, as these alleles are just being discovered or unmasked by this cultural habit, according to Deacon the emphasis here is on the causal factor for selection, which is a cultural phenomenon.

Small selective advantages are sufficient for evolutionary change: according to Haldane (1927), a variant that produces on average 1% more offspring than its alternative allele would increase in frequency from 0.1% to 99.9% of the population in just over 4,000 generations. As discussed in e.g. Stone and Lurquin (2007), the speed of natural selection depends on relative fitness of a trait/mutation. The time necessary for a gene variant frequency to change is proportional to the difference in fitness of the variants competing in the population.

As one example, the fitness of lactose tolerance is 2–3% higher in dairy areas. It took about 5,000–10,000 years to reach the current rates of lactose tolerance among northern Europeans, which is close to 100% in some cases. For sickle cell anemia the fitness of the AS heterozygotes can be 9–10% greater, because they are clinically normal, and because they are protected from malaria to some extent. According to Stone and Lurquin (2007: 104–5), in this case it took only 2,000 to 3,000 years, or even less, to reach the equilibrium seen today. Moreover, fixations of different genes can go in parallel, and sexual selection can significantly speed up any of these processes, triggering a runaway effect (Fisher 1930; see also Miller 2000 and Hurford 2007).

This suggests that there was enough time to evolve language gradually, in stages, especially if the fitness value for each new stage of language was high. Given the scenario for the evolution of syntax outlined in this monograph, there would have been at least two major breakthroughs: (i) the emergence of the paratactic two-word stage out of a one-word stage (Section 7.2); and (ii) the emergence of hierarchical grammars, with transitivity and/or TAM marking (Section 7.3).²⁵ For each progression, one can identify several concrete communicative advantages, as per the previous sections.²⁶

7.5.2 *The timeline*

At this point, one wonders if my proposal has anything to say about the timeline for the evolution of human language. While the proposal as it is now cannot precisely

²⁵ There must have been many more developments and detours, including possibly a proto-conjunction stage, as discussed in Chapter 4, as well as many transitional stages, which left us with ambivalent structures, such as middles. Here, I focus only on the major breakthroughs, for which the evidence is the clearest, and leave the rest for future research.

²⁶ This is also consistent with the idea of punctuated equilibrium, according to which evolutionary change involves bursts of change that are relatively brief on the geological time scale, followed by long periods of stasis (Eldredge and Gould 1972; Gould and Eldredge 1977). For example, it is possible that the paratactic stage was stable for a long time.

place the stages of proto-syntax in evolutionary time, it is capable, even in this broad outline, of excluding some hypotheses regarding language evolution, and supporting others. This indicates that the level of granularity is appropriate, and that future research along these lines, and at this level of granularity, can certainly shed further light on this topic.

Consistent with the considerations of this monograph, it is likely, even though not certain, that the paratactic proto-syntax stage already characterized the *H. heidelbergensis* species, the common ancestor of both humans and Neanderthals, which would place the emergence of the proto-syntactic stage to as far as half million years ago. In fact, my proposal also cannot exclude the possibility that *H. erectus* also had some form of proto-syntax, especially considering that their brain doubled in size relative to that of the Australopithecus, who lived sometime between 4 million years ago and 2 million years ago. The earliest fossil evidence for *H. erectus* goes back to 1.8 million years ago and the most recent to about 140,000 years ago. It is conceivable that the capacity for paratactic grammars triggered a speciation event, such as a transition from *H. erectus* to *H. heidelbergensis* (or, if the deeper timeline for language is correct, a transition from Australopithecus to the hominin species).²⁷ Clearly, the pressure to be able to use and memorize innovative language combinations and abstract vocabulary would have certainly required increasingly more mental capability, and thus more brain capacity. There was nothing else at that juncture that would have required as much brain capacity as the paratactic stage of language would have, accompanied by an increase in vocabulary size (see Section 7.4).²⁸

According to Deacon (1997), the unusually expanded prefrontal brain regions (Footnote 27) are an evolutionary response to a sort of virtual input with increased processing demands, suggesting that language forced the brain to evolve in this particular way, or at least that it co-evolved with it (see also Diller and Cann 2013). As put in Darwin (1874: 634), “a great stride in the development of intellect will have followed, as soon as the half-art and half-instinct of language came into use; for the continued use of language will have reacted on the brain and produced an inherited effect; and this again will have reacted on the improvement of language... *The*

²⁷ According to Deacon (1997), symbolic language has been accruing from around the time that the Australopithecines were replaced by the hominins, some 2 million years ago, when ancestors became bipedal, freeing up their hands for tool use and gesture, and when brains expanded significantly. As he notes, in the australopithecine-hominin transition, our brains did not get bigger proportionately, but, rather, it was the forebrain, particularly the cerebellum and the cerebral cortex, which ballooned the most.

²⁸ Another potentially relevant observation is that *H. erectus* was possibly the first hominin to move out of Africa, as early as 1.7 million years ago, and spread as far as England, Georgia, India, Sri Lanka, China, and Java. However, as pointed out by McBrearty (2007: 140), no genetic mutation enhancing intelligence was necessary for hominins to migrate out of Africa, given that faunal exchanges between Africa and Asia have occurred sporadically since the land bridge at Sinai was established 17 million years ago. Finlayson (2009) also notes that having language in place, or a large brain, is not a necessary prerequisite for dispersions of this kind to take place.

largeness of the brain in man, relatively to his body, compared with the lower animals, may be attributed in chief part to the early use of some simple form of language—that wonderful engine which affixes signs to all sorts of objects and qualities, and excites trains of thought which would never arise from the mere impression of the senses . . .” [emphasis mine].

Dediu and Levinson (2013) review a number of recent findings suggesting that at least *H. heidelbergensis* had some form of language, based on the comparative evidence among its descendents: *H. sapiens*, Denisovans, and Neanderthals, as also suggested by Finlayson (2009: 116) (but see Berwick, Hauser, and Tattersall 2013 for criticism of this view). According to Dediu and Levinson (2013: 10), “language as we know it must then have originated within the ~1 million years between *H. erectus* and the common ancestor of Neanderthals and us.” The most interesting evidence comes from genetics, and Dediu and Levinson (2013: 5) conclude that Neanderthals and Denisovans “had the basic genetic underpinning for recognizably modern language and speech, but it is possible that modern humans may outstrip them in some parameters (perhaps range of speech sounds or rapidity of speech, complexity of syntax, size of vocabularies, or the like).” In addition to genetics, Dediu and Levinson also review evidence from the skeletal morphology, the morphology of the vocal tract, infant maturation, Broca’s area, brain size, cultural artifacts, and conclude that all the evidence is consistent with their proposal. According to them, the *H. heidelbergensis* species might have even spoken complex languages, comparable to human languages, which in my framework would imply a hierarchical stage.

Given the considerations in this monograph, it is much more likely that the hierarchical stage of language evolved only in *H. sapiens*, after the dispersion from Africa, or perhaps after a dispersion within Africa, and that *H. heidelbergensis*, as well as Neanderthals and Denisovans, only commanded the paratactic stage, that is, two-slot grammars, as well as one-word protolanguage. But, as it is clearly established in this monograph, this “mere” paratactic stage of language has a remarkable communicative potential. Interestingly, Dediu and Levinson (2013: 11) hope “that some combinations of structural features will prove so conservative that they will allow deep reconstruction.” My hope is that this monograph has provided just such a conservative structural feature which can be used for reconstruction, the two-slot absolute-like platform.

On this scenario, the second major breakthrough, the one that brought about hierarchical grammars, would have originated with *H. sapiens*. On one view, the *H. sapiens* species is taken to have emerged in Africa around 200,000 years ago, and dispersed out of Africa about 60,000 years ago, to Asia and Europe, where the species co-existed with Neanderthals for a while (see e.g. Stone and Lurquin 2007). Neanderthals are thought to have left Africa much before *H. sapiens*, and lived in Europe and Asia since at least 200,000 years ago, dying out about 20,000 years ago. In the scenario outlined above, Neanderthals would have commanded the paratactic use of

grammar, inherited from the common ancestor with the *H. sapiens*, but would not have inherited hierarchical grammars from the ancestor, as hierarchical grammars would have only emerged in the *H. sapiens*. This of course does not mean that Neanderthals could not have, independently, evolved layers of grammar on top of the paratactic foundation, or even musical language (see e.g. Mithen 2006; Section 2.4; 4.2). It only means, under this scenario, that whatever they built on top of the paratactic two-slot grammars, if anything, was not shared by the common ancestors.²⁹

However, the stages broadly outlined in this monograph are also consistent with the less likely possibility that paratactic grammars emerged only at the transition from the *H. heidelbergensis* to the *H. sapiens* species, in which case *H. heidelbergensis* (and possibly *H. erectus* and Australopithecus) would have been stuck in a one-word stage, with some basic vocabulary but no syntax, or even in a stage without any words at all. In that case, Neanderthals would not have inherited the paratactic grammar from the common ancestor, as the common ancestor would not have had one, but, again, it is possible, if not likely, that they could have developed some form of proto-syntax on their own. Under this more recent scenario for the evolution of language, it would be hard to explain why the brains ballooned in the transition from the Australopithecus to *H. erectus*, as per previous discussion. But even this recent scenario would have allowed enough time for syntax to evolve gradually in stages, as pointed out above.³⁰

Importantly, there are certain scenarios for the evolution of syntax that are not consistent with the approach outlined in this monograph. For example, a great degree of crosslinguistic variation in how different languages build upon the postulated foundational paratactic stage suggests that the hierarchical stage did not emerge in all its complexity and in a uniform fashion only once (in Africa), but instead multiple times, and independently, either within Africa, or after the dispersion from Africa. If it had emerged only once, before *H. sapiens* spread out, it would be difficult to explain why there is so much variation across languages of the world in how they

²⁹ Recall that paratactic grammars are characterized not only by compound insults and rudimentary small clauses, but also by paratactic clause combinations, of the kind:

- (i) Easy come, easy go. Come one, come all. You sow, you reap. You seek,
you find.

For what it is worth, such symmetric, parallel combinations would have been easy to fit onto simple melodies, and to develop musical protolanguage from. As pointed out in Sections 2.4 and 4.2, such paratactic structures rely on prosodic glue to hold them together, and if there was musical protolanguage at any point in human evolution, then it would have been most useful in this stage.

³⁰ As observed by Maggie Tallerman (p.c. 2014), in this scenario the transitions from one stage to the next could have been so swift as to become close to saltationist views of the evolution of language. In my view, what is important for distinguishing the gradualist, incremental approaches from saltationist approaches is not so much the amount of time that elapsed from having no language to having hierarchical language, but rather whether or not there were well-defined incremental stages, to provide the scaffolding without which natural/sexual selection could not have been able to operate.

express transitivity (by ergative, accusative, or other means), or in whether or not they grammaticalize tense/aspect/mood systems, to name just some parameters of variation. Dediu and Levinson (2013) mention that interbreeding with Neanderthals or Denisovans, or just the contact with their languages, may have contributed to the differences among human languages. While this may be possible in principle, a proposal of this kind would have to be made much more explicit in order to be evaluable. At present, what my approach can say for sure is that all human languages have the paratactic grammar as a common denominator, and, if anything, it would have been this kind of paratactic grammar that was also shared by Neanderthals and Denisovans, if it was indeed present in their common ancestor, *H. heidelbergensis*.

What all human languages and constructions undoubtedly have in common is the paratactic platform, that is, the ability to combine two words or two clauses paratactically, essentially the properties of the postulated flat, intransitive, absolutive-like stage.³¹ As pointed out above, all the hierarchical phenomena discussed in this book, including transitivity and subordination, have alternative routes, as well as precursors, in parataxis. This is a deep, conservative property of human language that young children across cultures seem capable of, and that pidgin speakers and second language learners seem to often resort to. However, as pointed out in Sections 7.2 and 7.3, modern languages vary with respect to whether they exhibit grammaticalized expression of TAM (tense/aspect/mood), recursive clause embedding, and a particular type of transitivity, all properties of hierarchical syntax. In other words, if transitivity and TAM emerged only after the dispersion of hominin populations, we can explain the vast variation across languages in how they choose to express them, or not. This would in turn mean that the common ancestor with Neanderthals and Denisovans did not have hierarchical syntax.

The postulations in this monograph, as they stand now, are not capable of choosing between the uniregional and multiregional hypotheses about human origins. According to the widely accepted uniregional hypothesis, the Asian and European *H. erectus* lineages went extinct in all the places into which the species migrated (see e.g. Stone and Lurquin 2007). In the meantime, *H. sapiens* evolved only once from *H. erectus* in Africa (around 200,000 years ago), where *H. erectus* also went extinct. The African *H. sapiens* populations migrated out of Africa around 50,000 to 60,000 years ago, which would mark the second dispersion out of Africa (Out of Africa II model). Within this scenario, my approach is consistent with *H. sapiens* exhibiting basically only the paratactic grammar before the dispersion to different geographical locations, as pointed out above. This paratactic grammar would have

³¹ The use of linkers/proto-conjunctions, as discussed in Chapter 4, may also be common to all or most languages, and this would be another good topic for further research along these lines. If it turns out that languages differ significantly in this respect, this might help situate the stages of language in time more precisely.

provided the common platform upon which all languages could build further complexities, often in diverging directions. Still, the syntactic variation among languages would be largely constrained by the shared scaffolding that paratactic (absolute-like) grammars provide.

Recall that *H. erectus* traveled out of Africa around 1.7 million years ago, spreading to Europe and Asia, where fossil evidence of the species was found. The absence of older hominin fossils in Europe and Asia (and in the Americas) is taken as evidence that *H. erectus* evolved only once, in Africa. According to the much less accepted multiregional hypothesis regarding human origins, the local *H. erectus* populations in Africa, Asia, and Europe differentiated into *H. sapiens* independently, by a process of parallel evolution, as well as some admixture among the populations (see e.g. Stone and Lurquin 2007).³² If this hypothesis turns out to be correct, then, under my approach, one would have to say that *H. erectus*, prior to the migrations out of Africa, already commanded the foundational paratactic grammar, and that the more complex hierarchical grammars emerged separately in different geographical locations, after the dispersion. On this scenario, the hierarchical grammars could have emerged much earlier than with the uniregional hypothesis, given that the dispersion took place much earlier, around 1.7 million years ago. On the other hand, if the uniregional hypothesis is correct, then the dating of the emergence of hierarchical syntax would be in a more shallow time frame, sometime around 60,000 years ago, after the second dispersion out of Africa took place, involving *H. sapiens*.³³

As discussed in Section 2.5.4, initially, it was reported by Enard *et al.* (2002) that FOXP2 gene mutation in humans occurred at some point in the last 200,000 years, which would have neatly coincided with the emergence of hierarchical syntax. However, it has since been found that the same mutation characterizes Neanderthals (Krause *et al.* 2007), which pushes the mutation back to at least the common ancestor, about half a million years ago. This finding was a disappointment to the adherents to the saltationist view, for whom the initial report by Enard *et al.* provided

³² As pointed out by Finlayson (2009), the distinctions between *H. habilis*, *H. erectus*, *H. sapiens*, and other hominins are not as clear-cut as is typically assumed. For example, when it comes to the size of the brain, while the brains of *H. sapiens* are certainly larger on average than the brains of *H. erectus*, Finlayson (2009: 42–3) points out that the variation within species is so large that some *H. erectus* individuals were within the human range. This speaks in favor of the gradualist approach to the evolution of language and cognition.

³³ There may be another possible scenario for the timeline for hierarchical syntax, which would allow for an earlier timing of hierarchical syntax. Namely, it is possible that hierarchical syntax emerged independently among different populations in Africa, and that, as these different populations migrated to different parts of the world, they brought with them these diverse hierarchical grammars. According to Stringer (2007: 17) and Finlayson (2009), there are still many uncertainties about human timeline and dispersals. Stringer mentions that there might have been an African version of multiregionalism, citing “growing molecular evidence of deep divisions within African populations.”

encouragement (see Piattelli-Palmarini and Uriagereka 2011 for discussion). Diller and Cann (2009; 2012: 171) even propose that the FOXP2 mutation should be dated back to 1.8 to 1.9 million years ago, approximately the time when *Homo* (*Homo habilis*, *H. ergaster*, and *H. erectus*) emerged.

Another type of evidence that has often been invoked in favor of the saltationist view has to do with the postulation of the “Middle to Upper Paleolithic transition/revolution.” Based on archeological findings, Mellars (2002) and others have initially suggested that there was a major transition/revolution around 43–35,000 BP, characterized by major changes, all reflecting shifts in many different dimensions of human culture and adaptation: new forms and complexity of stone, bone, and other tools; explosion of explicitly decorative or ornamental items; representational art carving of animal and human figures; increase in human population densities. To many this “symbolic explosion” was exactly what one would expect from a major shift in the complexity of language patterns, possibly associated with corresponding shifts in the neurological structure of the human brain (Mellars 1991: 35; Bickerton 1995; Pinker 1995; Mithen 1996). These archeological findings were often interpreted to mean that language (or syntax) *in its entirety* arose at this juncture, through one single event, such as a mutation (see e.g. Chomsky 2005, 2010; Berwick and Chomsky 2011; Tattersall 2010).

However, the recent findings lead to the conclusion that there was no human revolution, at least not at this particular juncture (see e.g. McBrearty and Brooks 2000; McBrearty 2007; and Mellars himself 2007: 3). According to Mellars (2007: 3) “there is now ample evidence . . . that virtually the whole pattern of radical behavioural changes as reflected in the archeological record of the classic Middle-to-Upper Paleolithic transition in Eurasia is due entirely to the replacement of one human population (that of the Eurasian Neanderthals) by the new, intrusive populations of biologically and behaviourally modern humans, from an ultimately African source.” Consequently, this archeological situation cannot reflect some *in situ* cultural or evolutionary processes. According to McBrearty and Brooks (2000) and McBrearty (2007), a much more gradual and piecemeal pattern of development of new technological innovations can be documented in Africa.

It should also be pointed out that even if there had been an explosion of cultural artifacts in the archeological record at this or some other point, it would not have followed that language or syntax emerged at that point, or that they emerged suddenly. Definitive conclusions in this regard are especially difficult to draw given the common assumption among linguists, based on present-day cultures, that it is possible to have a highly complex language in the absence of any complex culture (see e.g. Roebroeks and Verpoorte 2009; Tallerman, 2014c; and references there). This in turn means that a sudden emergence of culture does not imply a sudden emergence of language, which means that this never was a plausible argument for the saltationist views in the first place.

In summary, there are no real obstacles for studying the evolution of language/syntax within the Darwinian adaptationist framework, along the lines proposed in this book: there was plenty of evolutionary time to evolve syntax in stages, and each stage can be shown to accrue concrete and important communicative advantages, including precision in the expression of e.g. argument structure, as well as the capacities for insult, displacement, and recursion. In addition, languages of the world show variation consistent with the postulated stages, and there are fossils of these stages to be found across languages and constructions. Furthermore, this reconstruction can serve as a source of possible hypotheses for correlating linguistic variation with genetic variation.

Conclusion

The basic proposal of this monograph is that the capacity for syntax evolved incrementally, in stages, subject to selection pressures. Following an internal reconstruction of syntax, based on the syntactic theory adopted in Minimalism and its predecessors, this monograph arrives at the stage of human grammar which had no tense (no Tense Phrase), and no transitivity (no vP), but only the rudimentary small clause structure consisting of a verb and just one argument (typically a noun). This proto-grammar could not differentiate between subjects and objects, and it knew of no Move or recursion. This is essentially an absolutive-like, binary, two-slot grammar, which can nonetheless create not only rudimentary small clauses (e.g. “Come winter, . . .”), but also paratactic binary combinations of such clauses (e.g. “Come one, come all.”). It can also create some stunning insults in the form of compounds.

The internal reconstruction is based on stripping off the layers of functional structure typically associated with a modern clause in Minimalism:

(1) CP > TP > vP > SC/VP

[where CP is a Complementizer Phrase, TP a Tense Phrase, vP a transitive (light) Verb Phrase, VP the basic Verb Phrase, and SC a Small Clause.]

The logic behind the proposed reconstruction is straightforward: while VP/SC can be composed without a vP or a TP layer, a vP or a TP can only be constructed upon the foundation of a VP/SC. Moreover, while imposing an additional layer of structure upon the foundational SC, whether it is a vP, a TP, or both, necessarily results in a hierarchical construct, the SC itself can be a flat, headless, paratactic creation.

Strikingly, as this monograph shows, languages of the world abound in the “fossil” structures approximating this paratactic, two-slot, one-argument proto-grammar. Such fossils are found among nominals, certain exocentric compounds, unaccusatives, root small clauses, absolutive constructions, and absolutive-like constructions in nominative-accusative languages, as well as among the so-called “middles,” the structures that blur the boundary between intransitivity and transitivity, between passives and actives, and between subjecthood and objecthood. Middles are just one of several examples of transitional structures discussed in this monograph, which

straddle the boundary between stages, providing support for a gradualist approach to the evolution of syntax.

That one should find fossils of previous stages in the structures of the more recent stages is consistent with the recurring theme of this monograph, taking the advent of each new stage to preserve the achievements of the previous stages. In addition to fossil structures often being used side by side more complex structures, this monograph also shows that the fossils of proto-syntax are built into the very foundation of modern syntactic structures. For example, a modern sentence (TP) is built upon the foundation of the proto-syntactic small clause, as if the building of a modern sentence retraces its evolutionary steps.

For each postulated major stage of the evolution of syntax, including the absolutive-like two-word stage, and the hierarchical transitive (vP) and TP stages, this monograph identifies clear and concrete communicative benefits which would have driven natural/sexual selection in each case. Not only that, but the level of concreteness and granularity of this proposal makes it possible to seek cross-fertilization among the (sub)disciplines of syntactic theory, evolutionary biology, neuroscience, language variation (typology), and even genetics, in pursuit of language origins. This proposal is also specific enough to be able to shed light on the hominin timeline, as it is able to discriminate among some competing hypotheses in this regard. One hypothesis that is not compatible with the findings in this monograph is that syntax emerged in all its complexity abruptly, as one single (minor) mutation/event.

By decomposing syntax into its evolutionary primitives, this monograph has demystified some of the otherwise problematic syntactic postulates, including Subjacency, recasting them in a completely novel light: in the light of evolution. For if syntax evolved gradually, through stages, this progression had to have left a mark on the very design of syntax, as well as on the way syntax is processed by the brain. This monograph thus finds an explanation for certain properties of modern syntax in the nature of its evolution, as well as outlines very specific neuroimaging experiments designed to test the proposed hypotheses. If language structure arose in a drawn-out coevolutionary process in which both brain and language structures would have exerted selection pressures on one another, then “we should expect to find that human brains exhibit species-unique modifications that tend to ‘fit’ the unique processing demands imposed by language learning and use” (Deacon 2003: 86–7). Importantly, the proposals and hypotheses of this monograph are compatible with the forces of natural/sexual selection, as well as vulnerable to verification not only by syntactic theory, but also by neuroscience and genetics.

When it comes to genetics, some recent experiments with mice suggest that the specifically human FOXP2 mutations are responsible for increased synaptic plasticity, as well as for increased dendrite connectivity (Enard *et al.* 2009). While syntactic theory can help identify proto-structures, and distinguish them from more complex structures, neuroscience can test if these distinctions are correlated with a different

degree and distribution of brain activation, and genetics can, among other possibilities, shed light on the role of some specific genes in making such connections in the brain possible (see e.g. Vernes *et al.* 2007; Newbury and Monaco 2010).

Decomposing syntax into its evolutionary primitives is the only way to arrive at concrete and testable hypotheses about language origins, as it is the only way to forge synergy among the fields of syntax, neuro-linguistics, and genetics, by also taking into account the geography of language variation. While each of these fields on its own may provide glimpses into the origins of human language, any conclusive account will ultimately have to be *both* based on a linguistic theory, and synergistic with the other relevant disciplines.

In sum, there are several components to this proposal that set it apart from the other approaches to the evolution of language. First, this approach pursues an internal reconstruction of the stages of grammar based on the syntactic theory associated with Minimalism, to arrive at very specific, tangible hypotheses. Second, it provides an abundance of theoretically analyzed “living fossils” for each postulated stage, drawn from a variety of languages. Third, and most importantly, this approach shows how these fossils do not just co-exist side by side with more modern structures, but that they are in fact literally built into the foundation of these more complex structures. Fourth, the postulated stages, as well as fossils, are at the appropriate level of granularity to reveal the selection pressures that would have driven the progression through stages. Fifth, this approach offers a very specific experimental design for testing the proposed hypotheses. Last but not least, it arrives at a reconstruction which stands a chance of being meaningfully correlated with the hominin timeline, as well as with the quickly accruing genetic evidence.

While this monograph provides a comprehensive framework for studying the evolution of syntax based on a theory of syntax, it is only a framework, a program, meant to stimulate further research and lead to better proposals. Further evidence will need to come from (i) additional syntactic fossils from more languages; from (ii) a better integration of language variation in syntactic theories; from (iii) neuro-scientific experiments targeting specific hypotheses about language evolution; and from (iv) the search for correlations between the geography of language variation and genetics, but with all of these quests mediated by a coherent and comprehensive evolutionary framework. While various pieces of the puzzle of the origins of human language are certainly still missing, my hope is that this book has placed enough pieces into the right spots to make the contour of the solution discernible.

Appendix

Testing grounds: Neuroimaging

CO-AUTHORED WITH NOA OFEN

1 Syntax and neuroimaging

Broadly speaking, this Appendix considers how evolutionary considerations can provide a missing piece of the puzzle to bridge the gap between the theory of syntax and the field of neuroscience. According to e.g. Poeppel and Embick (2005), what is needed but missing for cross-fertilization between the two fields is a theoretical framework of how they should be related. This monograph suggests that any such framework will have to take into account evolutionary origins of syntax, especially if syntax co-evolved with the brain. According to Deacon (2003: 86–7), if language structure arose in a drawn-out coevolutionary process in which both brain and language structures would have exerted selection pressures on one another, then “we should expect to find that human brains exhibit species-unique modifications that tend to ‘fit’ the unique processing demands imposed by language learning and use... Reciprocally, we should expect languages to exhibit structures that optimize limits in human working memory...” This gives a rationale for why evolutionary considerations may be the missing piece of the puzzle.

The same evolutionary considerations also promise to provide the necessary points of contact between the fields of neuroscience and genetics. The data and analyses in this monograph are presented in sufficient detail to allow for the formulation of specific hypotheses based on minimally contrasting structures. The availability of such concrete and testable hypotheses makes the proposals in this monograph vulnerable to falsification.

As pointed out throughout the monograph, neuroimaging methods involving subtraction or correlation can provide a fertile testing ground for various specific hypotheses advanced in this monograph. Roughly speaking, the subtraction neuro-scientific method is designed to compare and contrast how certain inputs are processed in the brain by subtracting the brain image reflecting the processing of one from that of another, isolating the differences between the two. The correlation method can be roughly characterized as correlating the increase in the stimulus complexity with the increase in brain activation. Both methods described above can employ brain-imaging techniques such as functional magnetic resonance imaging (fMRI), which measures differences in blood oxygenation levels accompanying neuronal activation.

Generally speaking, one can use these methods to determine how proto-syntactic structures (e.g. root small clauses, middles, exocentric compounds) are processed in comparison to their more complex hierarchical counterparts, in the hope of isolating neuro-biological correlates of, for example, TP layering and vP shelling/transitivity. For the reasons discussed below, the

prediction is that the processing of TPs and transitives with vP shells will show clear lateralization in the left hemisphere, with extensive activation in certain specific Broca's areas, as well as possibly in the anterior temporal lobes, while the corresponding proto-structures are expected to show less lateralization, and less involvement of Broca's areas, but more reliance on both hemispheres, as well as, possibly, more reliance on the subcortical structures of the brain (see Progovac 2010b for these hypotheses).

Despite the current impasse, neuro-linguistic research in the domain of syntax has yielded enough solid results to serve as a springboard for continued search for knowledge in this area.¹ There is growing consensus in the literature that language processing involves a large number of small but clustered and interconnected modules, as well as that the right hemisphere is also involved in language processing, more than previously thought (see e.g. Bookheimer 2002; Embick *et al.* 2000; Friederici, Meyer, and von Cramon 2000; Moro *et al.* 2001; Brennan *et al.* 2012). More specifically, various findings suggest that syntax itself is not a monolith, but a complex phenomenon that recruits multiple loci in the brain. In this respect, Moro *et al.* (2001: 117) point out that syntactic capacities are not implemented in a single area, but rather "constitute an integrated system which involves both left and right neocortical areas, as well as other portions of the brain, such as the basal ganglia and the cerebellum." Grodzinsky and Friederici (2006: 240) similarly conclude that each subpart of the linguistic system, including syntax, "can be neurologically decomposed into subcomponents." These findings are consistent with, and expected under, the evolutionary considerations explored in this project.

There are already quite concrete and specific findings about how some syntactic phenomena are processed. Neuroimaging findings support the claim that syntactic movement is associated with increased involvement of the inferior frontal gyrus (IFG). More specifically, syntactic movement is associated with increased activations in the left IFG, clustering around Broca's areas: Brodmann Areas (BA) 44 and 45, but also BA 46 and 47 (see e.g. Ben-Shachar, Palti, and Grodzinsky 2004; Constable *et al.* 2004; Friederici *et al.* 2006; Grodzinsky 2010; Grodzinsky and Friederici 2006; Stromswold *et al.* 1996).² The neural investigations mentioned above focus on the types of movement that involve visible rearrangements of the basic sentential constituents: the subject, the verb, and the object. For example, Ben-Shachar, Palti, and Grodzinsky (2004) consider object preposing in topicalization (as in *This paper, John dislikes*) and wh-questions (as in *Which paper does John dislike?*) in Hebrew and conclude that both types of movement yield comparable activation in a consistent set of brain regions, including left IFG. According to Grodzinsky and Friederici (2006: 244), complexity in these studies can be measured as the number of moved constituents.³

¹ According to Poeppel and Embick (2005), among others (also Poeppel 2008; Fedorenko and Kanwisher 2009), current neuro-linguistic research in the domain of syntax presents a case of cross-sterilization, rather than cross-fertilization. This is because, according to them, no meaningful correlates have been found, nor are expected to be found, between biological units of neuroscience (e.g. neurons, dendrites, axons) and the formal syntactic postulates such as Move, Subacency, Theta-Criterion. The proposal in this book (also in Progovac 2010b) is that the missing piece needed to bridge the two vastly different fields is the consideration of the evolution of syntax. This Appendix elaborates on that idea.

² In addition, syntactic movement poses specific comprehension difficulties for aphasic patients suffering from a lesion in Broca's region (e.g. Caramazza and Zurif 1976; Grodzinsky 2000; Zurif *et al.* 1993).

³ In assessing relative complexity, the literature on this topic typically uses as a starting point what are referred to as basic, canonical sentences, such as *John ran; John dislikes the paper*. In contrast, this proposal

There is converging evidence in the literature showing that increased syntactic complexity corresponds to increased neural activation in certain specific areas of the brain (see e.g. Caplan 2001; Indefrey, Hagoort, *et al.* 2001; Just *et al.* 1996; Pallier, Devauchelle, and Dehaene 2011; Brennan *et al.* 2012). The experiments performed by Pallier, Devauchelle, and Dehaene (2011) and Brennan *et al.* (2012) found a positive correlation between the levels of hierarchical structure and the degree of activation, even when keeping the number of words constant. In Pallier, Devauchelle, and Dehaene's experiment, the subjects were exposed to twelve word strings, but the conditions varied based on whether these twelve words were a single sentence, two or more shorter sentences, or just random words. The cumulative building of structure showed correlated accumulation of activation both in IFG areas, and in temporal lobe areas (e.g. posterior superior temporal sulcus (pSTS)). Most accumulation occurred in the single sentence condition, and the least accumulation with strings of random words, even though the accumulation was logarithmic, rather than linear. Brennan *et al.* (2012) exposed their subjects to a naturalistic twelve-minute story-telling experiment, in which the subjects passively listened to a fairy tale. Each word in the story was analyzed for its level of hierarchical embedding, and the degree of embedding was found to correlate with the amount of activation in the anterior temporal lobes, as well as in the left posterior temporal lobe, left IFG, and medial prefrontal cortex.

Section 2 of this Appendix considers root small clauses in Serbian and English, in contrast to their full sentential counterparts. Section 3 considers flat exocentric compounds in contrast to their hierarchical counterparts.

2 Small clauses vs. full sentences

Recall from Chapters 2 and 3 that Serbian unaccusative clauses are in productive use in three syntactic patterns: unaccusative (TP-less) root small clauses with the underlying VS order (1), TPs with the same V-T-S order (2), and TPs with subject movement, resulting in S-T-V order (3):

- (1) a. Stigla pošta.
arrived mail
- b. Pala vlada.
collapsed Government
- (2) a. Stigla je pošta.
arrived AUX mail
- b. Pala je vlada.
collapsed AUX government
- (3) a. Pošta je stigla.
mail AUX arrived
- b. Vlada je pala.
government AUX collapsed

advocates probing below this “basic” level, to the level of proto-syntax, in an attempt to compare the processing of TPs, some even transitive, with the processing of fossil structures, which are arguably a product of proto-syntax, still alive in the brain.

In Chapters 2 and 3, root small clauses such as (1) are analyzed as approximations of proto-sentences used in a TP-less stage in language evolution, exhibiting paratactic, flat structure assembled by the operation Conjoin. In contrast, the sentences in (2) and (3) are TPs, headed by the tense auxiliary *je*, where (2) keeps the underlying VS order, but (3) additionally Moves the postverbal subject to the specifier of TP position.

Given that TPs involve a layer of functional structure on top of the VP layer, the structures in (2) and (3) are necessarily instances of hierarchical, headed syntax. At the very least, the sentences in (2) and (3) involve more hierarchical layering than those in (1). According to the proposed analysis in Chapter 2, the examples above differ incrementally in their syntactic complexity, with (1) being the simplest, and (3) the most complex, because it involves not only additional hierarchical structure, but also Move.⁴

This analysis can be subjected to neuroimaging testing by applying either the subtraction method, or the correlation method, as introduced in Section 1. Starting with the contrast between the two TPs in (2) and (3), and assuming that movement incurs a processing cost, as established in many references discussed in Section 1, one can expect a difference in brain activation between these two types of structures. Any additional activation with (3) should thus reflect the neural correlates of syntactic movement of this kind. This finding would thus isolate the processing strategies which support the operation Move. In other words, the hypothesis is that sentences such as (3), in comparison to those in (2), will show more left-lateralization and more activation in purely syntactic areas, including, but not limited to, left Broca's areas.

More relevant to the proto-grammar considerations, one can also compare and contrast the processing of basic intransitive TPs, such as (2) above, and minimally contrasting TP-less small clauses in (1), arguably proto-syntactic creations. It is fortunate that these minimally contrasting pairs share the same meaning and vocabulary, differing on the surface only with respect to the presence vs. absence of the tiny functional word, auxiliary *je*, whose presence in this context contributes no difference in meaning. They are both unaccusative intransitive sentences with VS word order and with their subjects *in situ*, that is, not moved. Any detected difference in their processing would thus isolate a neuro-biological correlate of TP layering, or more generally, an incremental increase in hierarchical layering. Given that functional categories, including TPs, are postulates of hierarchical syntax, the prediction is that TPs in (2) will show more activation in the syntactic areas of the brain than their proto-syntactic counterparts in (1). This would be a prediction associated with subtracting (1) from (2).⁵ Employing a correlation method, such as the one used in Pallier, Devauchelle, and Dehaene (2011) or Brennan *et al.* (2012),

⁴ At first sight, the examples such as (1) can be seen as sentences whose trees have undergone "pruning," to use the metaphor explored in e.g. Friedmann and Grodzinsky (1997). According to the analysis pursued in this monograph, these sentences are nothing but small clauses (SCs), the most basic (paratactic) argument/predicate creations, which never were TPs. Instead of adopting the pruning metaphor, which suggests that we start from the top with the full syntactic tree, and then shed various functional projections, the view here is that such functional projections are never projected in these structures in the first place. It is for that reason that the TP-less proto-structures are expected to show less syntactic activation in e.g. Broca's areas.

⁵ Kolk (2006, and several references cited there) has also found that sub-sentential speech in e.g. German and Dutch, including small clauses, requires less processing time (is processed within a smaller temporal window), and that it is thus frequently resorted to in agrammatic production as preventive adaptation.

one can contrast blocks of sentences of type (1) with blocks of sentences of type (2) and look for enhanced activation with type (2) in e.g. the anterior temporal lobe.

While the prediction for subtracting (1) from (2) is clear, it is not completely clear what to predict for the subtraction of (2) from (1). The question is whether (2) completely subsumes (1), without a residue, or if there is some activation present in (1) but not in (2). Recall the argument from Chapters 2 and 3 that modern finite sentences are built upon the foundation of small clauses. This analysis is at the heart of the current syntactic theory adopted in Minimalism, as well as its predecessors. If this is directly reflected in the activation in the brain, then it may be that the subtraction of (2) from (1) will be null. However, it is also possible that there will be some additional activation in the brain associated with root small clauses, in which case the subtraction of (2) from (1) may be non-null. This important issue can only begin to be resolved by performing specific neuroimaging experiments of this kind, which will help identify further hypotheses to be tested.

If there is a residue in the subtraction of (2) from (1), then the residue may involve activation in the subcortical regions of the brain, as well as in the right hemisphere. One reason to hypothesize subcortical/right hemisphere activation comes from the expectation that the processing of proto-structures, those assembled by the operation Conjoin, would involve more ancient and more scattered processing strategies, as also discussed in Chapter 2. Another reason to expect this result comes from the observation that small clause structures tend to be (semi-)formulaic, as evidenced in many English and Serbian examples (see Chapters 2 and 3). According to e.g. Code (2005) and Wray (2002), formulaic speech in general is processed by the more ancient structures of the brain, showing resilience in the case of Broca's aphasia.

This is consistent with the recent findings that language is not solely supported by Broca's and Wernicke's areas of the brain, but also by the primitive subcortical basal ganglia, given that damage to the basal ganglia can cause serious harm to linguistic processing (see e.g. Gibson 1996; Lieberman 2000; Ullman 2006). According to Ullman (2006: 480–1), Broca's area is part of a larger circuit that involves the basal ganglia. The two parts of the brain are densely interconnected, and both are implicated in language processing, including in morphology and syntax. If the proto-syntactic structures (and the operation Conjoin) postulated in this monograph provide a foundation for the rest of syntax, and if proto-syntax is processed in part by subcortical structures of the brain, then it is expected that damage to these areas in the brain would significantly affect language. To put it another way, if the foundation is faulty, it will not be able to support the suprastructure. As pointed out in the previous section, Moro *et al.*'s (2001) study also reveals activation of basal ganglia and the cerebellum regions in syntactic processing, as well as the involvement of the right hemisphere (see also Bookheimer 2002; Embick *et al.*, 2000; Friederici, Meyer, and von Cramon 2000). The hypothesis here is that this is so because modern syntactic structures still rest on the paratactic foundation assembled by Conjoin, which in turn relies on the more scattered and more ancient processing strategies.

In conclusion, while the predictions regarding subtracting (2) from (1) are ambivalent (but testable), the subtraction of (1) from (2) is clearly expected to show increased activation in Broca's areas, and possibly also in anterior temporal lobes. If so, then neuroimaging experiments in this case can isolate direct neural correlates of utilizing a functional projection (e.g.

TP), and with it hierarchy. In addition, due to the highly specific and concrete nature of these hypotheses, neuroimaging testing in this case has the potential to tease apart movement (the operation Move) from hierarchical layering, as well as to observe the contribution of each hierarchical layer, one at a time.

If the theoretical predictions identified in this section get confirmed, the results will yield a strictly controlled three-way distinction in graded syntactic complexity: first, flat proto-syntax with no TP overlay and no movement possibilities, exhibiting only the operation Conjoin (1); second, hierarchical syntax with a basic functional category, TP, but no movement performed, exhibiting both Conjoin and Merge (2); and third, hierarchical syntax with both the basic functional category TP and movement, exhibiting not only the operations Conjoin and Merge, but also Move (3). This continuity of syntactic complexity, if found to correlate as predicted with brain activation, would provide plausibility for a gradualist approach to the evolution of syntax, as well as a promising new way of mediating between the fields of syntax and neuroscience. It is also significant that this framework can serve as a point of contact, an intermediary, between the fields of neuro-linguistics and genetics, as discussed in Sections 1.5 and 2.5.4).

One can use the same neuroimaging methods to test the processing of English root small clauses in (4), in contrast to the full TP counterparts in (5), as per the proposal in Chapter 2. The small clauses in (4) are expected to show similar properties as Serbian small clauses discussed above.

- (4) Case closed. Problem solved. Point taken. Crisis averted.
Mission accomplished.
- (5) The case has been closed. The problem has been solved. The point
has been taken. The crisis has been averted. The mission has been
accomplished.

Even though the clauses in (4) are certainly not exact equivalents of the Serbian unaccusative small clauses in (1), they do show enough syntactic similarity to warrant a comparison. First, these are passive-like structures, in which, just as is the case with unaccusatives, the subject is not the agent. For that reason, passives and unaccusatives often receive a similar treatment in syntactic theory (see e.g. Marantz 1984; Belletti 1988; Adger 2003).⁶ Another similarity is that both the Serbian data in (1) and the English examples in (4) are rigid small clauses assembled by the operation Conjoin. As such, they lack the Tense auxiliary verb (and TP), cannot have their constituents questioned (e.g. **How problem solved?*), and cannot embed into other clauses (e.g. **I think (that) case closed.*), as discussed in Chapter 2. Even though the full finite counterparts of these clauses (5) appear rather wordy, the additions are just functional words which, in this case, add little, if anything, to the meaning. The predictions regarding these English data are then comparable to the predictions for Serbian unaccusatives, as outlined above.

⁶ While the mainstream syntactic analysis would implicate movement in passive sentences, the approach explored in this book would suggest that these proto-syntactic passives do not involve movement, given the general rigidity of proto-syntactic structures in this respect (Chapters 2–4). The results of a neuroimaging experiment like this can shed light on this matter as well.

The general prediction of this proposal is that the distinction between small clause proto-syntax and hierarchical syntax cuts across a variety of data and even languages, and that one can isolate this distinction by looking at various minimally contrasting data of this kind across languages and constructions, including verbal compounds discussed in the following section.

3 Flat vs. hierarchical compounds

Neuroimaging experiments can also be devised to compare and contrast the processing of flat proto-syntactic VN compounds (6) and their hierarchical counterparts (7), both in English and Serbian, based on the analysis in Chapter 6.

- (6) pick-pocket, scare-crow, turn-coat, dare-devil, hunch-back,
wag-tail, tattle-tale, kill-joy, cut-purse, spoil-sport, rattle-snake,
catch-word, cry-baby, stink-bug, worry-wart, copy-cat, turn-
table
- (7) joy-killer, head-turner, truck-driver, meat-eater, brick-layer,
story-teller, tax-payer, heart-breaker

The flat (fossil) characterization of VN compounds, and their association with the operation Conjoin, predicts that they will exhibit less syntactic activation, and less lateralization in the left hemisphere, but possibly more reliance on the right hemisphere and the subcortical structures of the brain, such as basal ganglia, thalamus, and limbic structures, especially the compounds involving swearwords. As discussed in Chapter 6, VN compounds specialize for derogatory reference, and many among them are obscene. Code (2005) has provided some neurological evidence that swearwords are stored separately from other words, as they can remain intact even when e.g. aphasic patients cannot access the rest of language. According to Code (2005), the processing of swearwords relies on the right hemisphere of the brain, and on the subcortical structures, considered to be involved in emotional processing in general.

According to LeDoux (2000: 159), while the triune brain and the limbic theory for emotional processing (e.g. MacLean 1949; Isaacson 1982) may not provide an adequate theory of the specific brain circuits for emotion, “MacLean’s original ideas are very interesting in the context of a general evolutionary explanation of emotion and the brain.⁷ In particular, the notion that emotions involve relatively primitive circuits that are conserved throughout mammalian evolution seems right on target.”

LeDoux (2000: 159) further acknowledges that it is possible that cognitive processes involve other circuits, and that they might function relatively independently of emotional circuits (LeDoux 2000: 159). The VN compounds thus bring together both proto-syntactic structure assembled by the operation Conjoin and the subcortical underpinnings of swearing, rendering these compounds of particular relevance for the study of language evolution. The approach to the evolution of syntax outlined in this monograph provides some postulates which are at the right level of granularity to help bridge the gap between the fields of syntax and neuroscience. This approach may also provide an intermediary between genetic considerations and neuro-linguistic considerations, another important piece of the puzzle for evolutionary considerations.

⁷ For MacLean’s notion of the triune brain, see Section 2.5.5.

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