BOOK REVIEW

Syntax in the 21th century
Reflections on *The Bloomsbury Companion to Syntax*[*]
(London: Bloomsbury, 2013, 545 pages)

Pauli Brattico

1 Introduction

There is a "power of mind", Henri Poincaré observed, "which knows it can conceive of the indefinite repetition of the same act, when the act is once possible" (1905, p.13). He was referring to mathematical induction, an ability that lies at the core of mathematical intuition and discovery. The same ability is exhibited by human language. Thus, in language, one can put words together to craft more complex expressions, and then join these expressions together, indefinitely, to build bigger units. In short, all human languages have syntax.

The creative ability, whether in connection with language or mathematics, was often noted by the 17th century scholars, such as Descartes, and was much discussed and paid due attention. But it remained paradoxical. Descartes, for example, rejected the notion that the ability could be explained by whatever was available within the confines of the "mechanical philosophy" of his time, and assumed that it spawned from the immaterial human soul. All that changed during the early 20th century, at the time when Poincaré was writing. The best mathematicians of that period, Hilbert, Turing, Peano, Post and others, were trying to make the notion of "indefinite repetition" rigorous, and with much success. The theory of automata and recursive functions was finalized into its current form in the time span of just few decades.

The theory of language, too, had achieved substantial gains when we come to the early 20th century. There were several factors which went into this, among them the structuralist system and method that was applied with great success to the description and explanation of language change, and especially to the history of Indo-European languages. But the field gravitated towards behaviorism. Strict empirical, methodological and theoretical criteria swept the field. The doctrine was extreme.[1] It was, of course, not accepted universally and survived just one generation.

The study of syntax goes back in history several thousand years. During the structuralist era, however, syntax was mostly put to rest. The behaviorist doctrine was so strict that it made examination of more abstract and complex phenomena difficult. Consequently, the doctrine was mostly applied to the "sound side" of language. The situation changed when the theory of computation, developed by mathematicians some decades before, started to make its way into linguistics and psychology during the 1940s and 1950s. This meant that there was suddenly a rigorous way to describe and explain

[*] An anonymous FULL reviewer provided valuable feedback that resulted in a much better article. This help is greatly appreciated.

[1] Behaviorist psychology sometimes lapsed into most extreme positions. This happened without recognizable empirical justification. Structural linguistics had different roots, but, at least in my reading, it allied closely with the positivist and behaviorist maxims.

how the mind can combine words and complex linguistic units, by means of "indefinite repetition of the same act", into bigger and bigger units. And not just in language, but in other cognitive domains as well.

At the forefront of these developments was the generative grammar, initiated by Noam Chomsky in the 1940s and 1950s and then developed by many others. The results were perceived by many as unacceptable, and there are still pockets of researchers who deem the enterprise as inadequate or even fundamentally misguided. But the core of this was that, after rigorization sweeped the field, a rich layer of hitherto unknown complexity emerged from what was regarded essentially a trivial phenomenon by previous generations. Language was not a simple catalog of trivial rules, behavioral responses or histories of reinforcement.

It sometimes seems as if the field has still not come to terms with this discovery. A schizophrenia prevails in which one group of linguists, and especially scholars from adjacent fields, maintain that syntax is mostly trivial, based on analogy, meaning or social convention, while a passing glance at any volume such as the one under review – a companion to syntax – contains syntactic curiosities filling page after page, many still mysterious and subject to debate. The same picture emerges by opening a professional linguistic journal dealing with syntax. If anything, the cognitive revolution promoted an appreciation of the fact that therein lies a hidden layer of complexity below commonsense understanding, so much so that it makes it very hard today to design a "companion to syntax" without making an extraordinary selection of topics examined in any depth, or indeed at all. And so it is in this case as well. It is a testimony to the richness of our field that only the surface of all there is in syntax can be touched in a large and penetrating volume such as the present one.

The *Companion to Syntax* takes as its stated mission a highly unusual approach which covers syntax without committing itself to any single syntactic framework. Some chapters are written within the generative framework, others come with a functionalist-typological orientation. I will follow a similar path in my review, therefore contrasting different approaches. I will also complement the issues under discussion by using data from Finnish. Core ideas and empirical phenomena are explained with the help of illustrations. These should help a non-expert reader to understand the matter under discussion.

2 Phrase structure

At the heart of syntax, and thus at the heart of any *theory* of syntax, lies an ability to make bigger units from simple ones. This is Poincaré's "indefinite repetition of the same act". In the case of language, we can put words together to form complex constituents, and complex constituents to make more complex units, and so on, indefinitely. Linguistic theory "is concerned with the infinite", Mark Baker notes in his chapter on the methods of generative theory (Chapter 2), "because most people can easily create and interpret an unbounded number of distinct sentences and sentence types" (p. 22). We are challenged to explain "how a finite amount of experience and knowledge can be used to construct and interpret an infinite (unbounded) range of new sentence types", by using "some sort of recursive rule system – a generative grammar in the broadest sense" (p. 23).

The ability must emerge from the human brain. Whether it exists in any nonhuman central nervous system is controversial. Even the question of whether it exists, in an unbounded form, also within other cognitive domains (mathematics, thought, navigation)

completely independent of language is debated.[2] These two questions motivate much of the discussion concerning recursion within present day cognitive science. During the early days, in contrast, the most pressing issue was how to describe that ability even in principle. One of Chomsky's early contributions to the debate was to show that finite-state computation is insufficient, a result which crystallized, through several intermediate steps, into the phrase-structure model of recursion of the 1960s. It is from this point in time that Jairo Nunes (Chapter 6) picks up the story and reviews the development of generative theorizing concerning recursion, up to the present-day minimalism and the theory of Merge. Thus, language- and construction-specific phrase-structure theories (i.e., familiar rewriting rules such as S → NP + VP) were first transformed into the more general X'-theory during the 1970s, which was in turn transformed into the more abstract bare phrase structure theory of the 1990s. At present, recursion is captured by assuming an operation, Merge, whose sole function is to combine two syntactic units into a set (Figure 1).

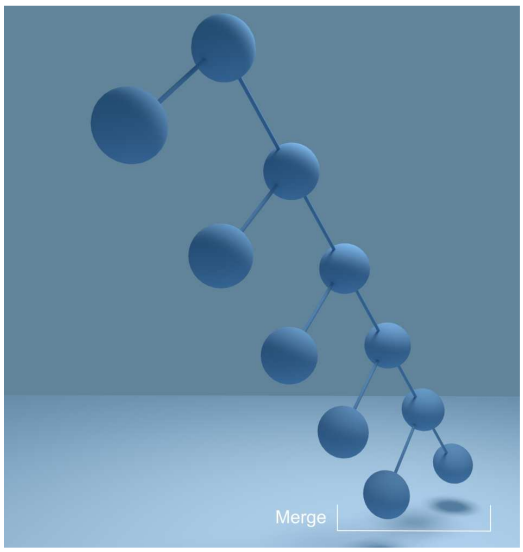

Figure 1. A fundamental aspect of natural language syntax is an ability to construct an endless variety of expressions by utilizing a discrete-combinatorial mechanism. That mechanism puts words and complex units together, as shown in this figure. The first attempts to model that ability with rigor led into the phrase-structure theories of the 1960s, which were then abstracted in a step-by-step manner, until a theoretical minimum was achieved: the theory of Merge. It says that linguistic expressions are crafted by putting primitive and complex items together, and this is all it says. By applying Merge iteratively, it is possible to craft complex constructions, such as the one shown here. The units in this figure can be words, morphemes, and complex phrases. Notice the lack of more sophisticated devices, notation or processes: Merge puts elements together and that's the only thing it does.

A notable aspect of this line of theorizing is its simplicity. The theory says that linguistic expressions are, at root, sets of elements with lexical items at the bottom. Why did it take fifty years to come up with such a simple solution? The explanation is that, on surface at least, language is *not* that simple. Expressions and constituents arrange themselves into asymmetric configurations, which the symmetric set-Merge captures rather poorly. In other words, iterative application of Merge must generate all the familiar core syntactic notions, such as the adjuncts, complements and specifiers, among other relational categories, while it is not trivial to show that it is able to do so. Chomsky (1965), for instance, observed that "the evidence presently available is overwhelmingly in favor of concatenation-systems over set-systems". He continued: "In fact, no proponent of the set-system has given any indication of how the abstract underlying unordered structures

[2] Thus, Fukui & Zushi (2004) observe that the recursive ability, as it is formulated in the more recent theories (reviewed below), "is a simple and general operation that combines two elements, and there seems no basis to claim that an operation like this is employed only by the language faculty. Rather, it is natural to assume that Merge is just an instance of a basic (cognitive) operation within logic, thinking, and other forms of human cognition" (p. 12). The recursive ability is a supramodal, perhaps modality-neutral, apparatus (Brattico & Liikkanen 2009, Brattico 2010).

are converted into actual strings with surface structures" and so "the problem of giving empirical support to this theory has not yet been faced" (p. 125). Finally, "there is no reason to consider the set-system, for the time being, as a possible theory of grammatical structure" (p. 126). That was fifty years ago. Today, the question is a matter of ongoing research effort. On balance, those asymmetries were stipulated axiomatically in the PS-theory and X'-theory, a stance that is not illuminating. Overall, the question of whether the simplest set-theoretical theory of Merge will be sufficient and, if not, what should be added to it, constitute interesting open questions. The topic is discussed by Nunes, as well as Claudia Parodi and A. Carlos Quicoli, the latter who review various types of complementation structures in Chapter 19.[3]

A theory of syntax, and Merge, must also establish a system of *grammatical relations* (GR) which link predicates to their arguments (i.e., the arguments *Pekka* and *the ball* must be linked to the predicate *drop* in a sentence *Pekka dropped the ball*). It must be one of language's main functions to link predicates and arguments to describe propositions and situations. How this is achieved depends on one's theoretical framework. In the generative theory, the core idea today is that there are functional heads which cast theta-roles, such as agent and patient, to other constituents in the phrase-structure by proxy. Specifically, most current theories offer a system where this happens by means of head-complement configurations (i.e. V-XP) and head-specifier configurations (XP-*v**), as shown in Figure 2. For those unfamiliar with this notation, the crucial idea is that a substantial portion of the explanation of the syntax and semantics of grammatical relations is based upon phrase structure geometry.

Keeping Figure 2 in mind, consider a simple sentence such as *Pekka pudo-tti pallon* Pekka.NOM drop-CAU ball.ACC. The derivation begins by merging an intransitive verb V *puto-* 'drop' together with a DP, which is then theta-marked as the patient. This is interpreted akin to 'the ball falls(drops)'. Next, a transitivizer *-tta-* is merged, and that head will theta-mark another DP as the agent, the "causer" of the ball's dropping. We derive an expression where the agent causes the event where the ball drops, in short, an event where Pekka drops the ball.

---

[3] Helasvuo (Chapter 5) discusses the notion of linguistic constituent and the ways constituents are associated with intonation and language use. She puts forward astonishing empirical claims. She says that phrase structure trees and bracketed structures represent constituency in a way that is "isomorphic to the linear order of written words", which is based on "conventional conceptualization" of how we organize speech temporally. In addition, she claims that phrase structure "may" be needed to explain "rules governing word order" in "some languages" (p. 67). It is not clear what justifies these extraordinary claims. To posit a frank isomorphism between linear order and phrase structure strikes me as beyond empirical possibility. If linear order and phrase structure were isomorphic, expressions could never be structurally ambiguous. In addition, and contrary to what Helasvuo argues, the existence of free word order principles (if there are such) warrants a wholesale rejection of neither phrase structure nor the notion of constituent. Phrase structure is concerned with generativity in language and mind; non-configurationality concerns certain surface symmetries in how some words behave in some languages under some restricted scenarios. See Francisco Ordóñez' chapter on scrambling in the present volume. Finally, why is there something "conventional" about phrase structure is never explained nor justified.

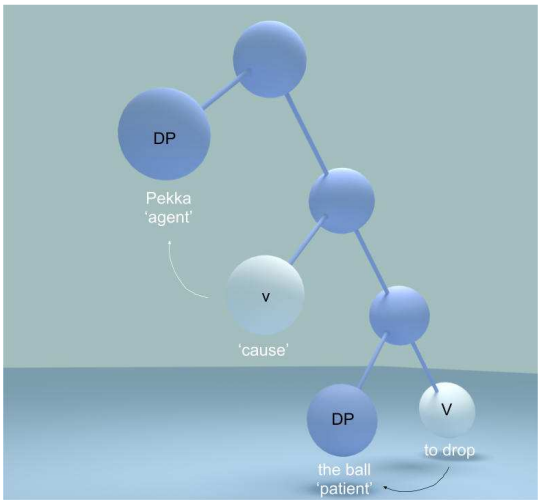

Figure 2. According to the standard generative theory, some constituents (DPs) are read off as arguments when they appear in close proximity to specific theta-marking functional nodes (marked circles V and v). Theta-marking casts theta roles (e.g., agent, patient) from predicates to their arguments. Theta-marking is shown here by the arrows. Argument-predicate configurations are established in syntax, and then interpreted semantically by additional mechanisms. The semantic-conceptual mechanisms are able to "understand" what it means to be an agent or patient, something that is obviously not part of the phrase structure. It also follows that certain functional heads only assign certain specific theta-roles. In Finnish, for instance, the agent participle suffix -mA correlates with agent theta-marking (*Pekan syömä eipä*, lit. Pekka.GEN eat.mA bread, 'a bread eaten / by Pekka'), the patient participle suffix -vA correlates with the patient role (*leipää syövä Pekka,* lit. bread.PRT eat-vA Pekka, 'Pekka who eats bread.'), and so on. These are functional items which come to the syntactic derivation with specific theta-marking properties.

As pointed out by Doris L. Payne (Chapter 13) in her chapter on grammatical relations,[4] these theories assume that grammatical relations are "read off" from phrase-structure. Linguistic form and conceptual substance are two separate things. But this is not inevitable. Other theories, as she points out, assume either that grammatical relations are primitive, axiomatic relations, or that they are inherently semantical. We take a look at the latter option, which brings us to the age-old problem of relating language with meaning, a question touched upon in Payne's survey of theories of grammatical relations.

Let's begin with the generative position. The generative position is essentially that language is more creative than thought. Thus, the system can merge almost anything without paying attention to meaning. One can merge {*colorless* {*green idea*}} as well as {*colorful* {*red tomato*}}, with the concomitant syntactic and morphosyntactic computations proceeding as if there were no difference. But there is a difference. While *colorless green idea* presents no coherent idea to the mind (not, at least, to my mind when literally interpreted), *colorful red tomato* very much does. So what the syntactic machine regards as two near-identical noun phrases, the semantic system sees as two completely different things. Similarly, one can merge *Pekka pudotti pallon* 'Pekka dropped the ball', but also *Pallo pudotti Pekan* 'ball dropped Pekka', two sentences which are syntactically identical yet semantically they are a world apart. Figure 3 illustrates these assumptions.

[4] Payne approaches theories of grammatical relations from a bird-eye perspective, going through a host of relevant issues, such as case marking, pivot behavior, valence, semantic roles, pragmatics, salience and "alignment". He also discusses the way how grammatical roles are distinguished by case marking under valency changes, giving rise to, for example, the familiar nominative-accusative and ergative-absolutive patterns.

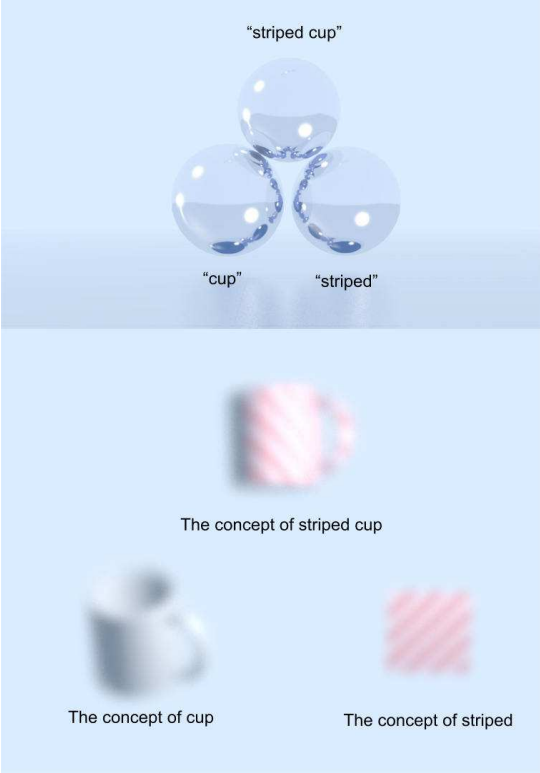

Figure 3. According to the generative position, language (words, sentences) and meaning (concepts, thought) are, in principle, independent objects. They are, however, connected with each other. The point of contact is referred to as "Logical Form" (LF), here represented by the surface plane. Above that surface, there is language and its computational operations (e.g. lexical items, Merge). Below lies a world of concepts, thinking, planning, action and free will. The world of linguistic representations and conceptual representations are linked systematically with each other. This is how the word *cup* comes to be linked with the concept CUP, the word *striped* with the concept STRIPED, and a complex phrase *striped cup* with a cup that has stripes all over it. A phrase *colorless green idea* refers to nothing, and there are likewise thoughts and experiences which cannot be fully described by words only (e.g. musical melodies). In addition, this view suggests that the operations above the plane and operations below the plane are supported by their own, partially independent neuronal networks. Thus, it becomes possibly to lose one's language without losing one's ability to think, and vice versa.

An opposite perspective is proposed by the semantically and functionally oriented theories. They "take the stance that linguistic forms or grammar should not exist without an essential tie to something conceptual or functional" (Payne, Chapter 13, p. 226–7). The functionalist perspective is discussed in this book further by Paul J. Hopper (Chapter 24, "Usage and syntax") and Laura A. Michaelis (Chapter 25, "Construction Grammar and the Syntax-Semantics Interface"). The latter assumes that "semantic constraints and use conditions are directly associated with the phrase-structure rules that define constructions, rather than being 'read off' syntactic representation" (p. 422). What should capture our attention here is the phrase "directly associated". Although this view accepts the notion that syntactic forms and symbols do exist, semantics is still *constitutively* linked with such objects.

Going back to Figure 3, the idea is that the "separation plane" doesn't exist. Even if there might be some types of formal symbols, they are constitutive parts of semantic units and, hence, the two are inseparable. Thus, when we combine the words *striped* and *cup* into *striped cup*, there is no independent, autonomous syntactic operation which puts the words together; we combine some image/representation of a cup with an image/representation of the stripes, so that the stripes are painted on the exterior surface of the cup (see Figure 3). Helasvuo (Chapter 5) thus points out that, in a semantics-based grammar such as Langacker's cognitive framework, syntactic constituency is seen "primarily as a part-whole hierarchy" and it is related "to other aspects of human cognition suggesting that constituency is not unique to grammar or to language but that it is a general feature of our cognition". It emerges "from more basic phenomena such as conceptual grouping, phonological grouping, and symbolization" (p. 73). Everything has an unbreakable connection to meaning. We will return to this theme shortly, but first we'll have a look at another controversy.

The term "construction grammar", mentioned above, introduces another

substantial point of disagreement. While the current generative theory assumes just one recursive process (Merge), in construction grammar there are as many ways of doing combinations of linguistic units as there are constructions (passives, middles, transitives, intransitives, dative constructions, psych-verbs, interrogatives, relative clauses, etc). Each of these has potentially its own rich semantic and use properties. Michaelis' chapter on construction grammar discusses this dimension. Note that the interaction between syntax and semantics, and the question of whether there is just Merge or a list of constructions, are two independent issues. For some reason, however, the construction grammatical viewpoint often goes in tandem with the semantics-based theory of syntax.

The two positions – one that goes with one operation, Merge, and the other which assumes an open-ended catalog of operations, constructions – are diametrically opposed to each other. I have remained skeptical of the construction based view. I would like to illustrate where I think the empirical disagreement lies by picking up another topic discussed in this volume: A-bar movement. It is discussed in several chapters ("Scrambling" by Francisco Ordóñez (Chapter 9), "*Wh*-movement" by Luis López (Chapter 18) and "Topic, Focus, and the Cartography of the Left Periphery" by Luigi Rizzi (Chapter 26).

To illustrate, we consider Finnish. In this language *wh*-interrogatives are formed by putting a *wh*-pronoun at the beginning of the clause. These *wh*-pronouns do not, however, appear out of the blue. They are matched with an empty slot further down in the sentence. In addition, the *wh*-pronoun must bear the morphosyntactic markers of a regular DP that would otherwise occupy that empty position. See example (1).

(1) ***Kenet*** *Pekka tiesi että Merja tapasi* __ *eilen?*
who.ACC Pekka knew that Merja met yesterday
'Who did Pekka know that Merja met yesterday?'

There is, therefore, a grammatical dependency between the *wh*-pronoun at the front and the empty slot "__" in another position. In the generative theory, that dependency is called "*wh*-movement", suggesting that the *wh*-pronoun had been moved from its canonical position to the left edge of the clause.[5] Some theories do not assume that there is *wh*-movement, but all theories recognize that there is a dependency between the *wh*-word and an empty postverbal position "__" that would otherwise be filled by an argument noun phrase.

Huhmarniemi (2012) noted that in Finnish it is not sufficient to move the *wh*-pronoun to the left edge of the clause. Several movement steps (or movement dependencies, if one wishes to resist the term "*wh*-movement") must often precede the final operation, as shown in example (2a) and Figure 4, which illustrate the same thing by using a relative clause. If we move the relative pronoun directly, an ungrammatical sentence results (2b).

(2) a. *saari* {{***jota***$_1$ *kohti* $\_\_{}_1$}$_2$ *purjehtimalla* $\_\_{}_2$}$_3$ *pääsemme kotiin* $\_\_{}_3$}
island which towards by.sailing we.get home
'an island, by sailing towards which we can get home'

[5] More recently, movement has been captured in terms of remerge, which portraits the operation as a form of Merge. There is no distinct movement operation. Even so, the basic premise of the movement analysis remains: the *wh*-pronoun is first merged to its canonical position, and then operations (Move, Internal Merge) are applied which make it reappear at the left edge.

b. *?*saari* ***jota***$_1$ *pääsemme* *kotiin* *purjehtimalla* *kohti* __$_1$
island which we.get home by.sailing towards

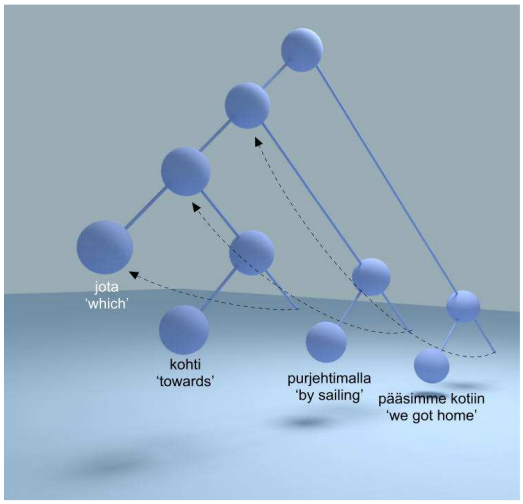

Figure 4. Derivation of relative and interrogative clauses in Finnish, according to Huhmarniemi (2012), involves several movement operations (in other words, dependencies between pronouns and gaps). The normal word order of the target sentence without the relative pronoun is *Pääsimme kotiin purjehtimalla kohti saarta,* lit. we got home by.sailing towards island, which is reversed due to the presence of the relative pronoun. The relative pronoun "snowballs" out of the structure on its way up to the left edge.

Huhmarniemi & Brattico (2013) observe that the intermediate movement steps in (2a) have same properties as the movement that dislocates just one *wh*-pronoun to the left edge. What this means is that there exists a general operation which applies to an infinite number of constructions, to whole sentences (e.g. example (1)) as well as to subsentential constituents (2a) and, moreover, it moves *wh*-pronouns, relative pronouns, focus elements and many others (Chomsky, 1977). It applies in an *across-the-board fashion*, irrespective of any particular "construction". Thus, when a property belongs to a particular construction, or to a family of related constructions, a good solution might be to apply the construction-based analysis. We will encounter this type of data in the next section. When it spans over all or several types of constructions instead, a general rule might be at issue.

We can now return to the issue, touched upon earlier and discussed in the book under review, of how language and thought interact. One view says that laws of syntax – how words arrange themselves into expressions – are at least in part independent of meaning and thought. The semantics-based view denies this assertion. It claims that the laws of syntax *are* the laws of thought, since syntax cannot be dissociated from meaning. Put this way, the matter is straightforwardly empirical. Take Finnish relativization in example 2 and Figure 4. The semantics-based view must claim that when the relative pronoun crawls higher in the expression, the process follows some law of thinking or cognition, perhaps a limitation of language processing. To examine what that law might be, we construct minimal pairs, such as (3a-b/4a-b), in which the first contains movement (pronoun-gap construction), the other doesn't, and then observe what semantic/processing difference emerges. Such a difference, if it accompanies the change every time, constitutes a candidate for a semantics- or use-based explanation.

(3) a. *saari* {*jota* *kohti* __} *purjehdimme* (movement)
island which towards we.sailed
'an island towards which we sailed'
b. island {towards which} we sailed (no movement)
'an island towards which we sailed'

(4) a. *Pääsimme kotiin purjehtimalla {saarta kohti __}* (movement)
we.got home sailing towards island
'We got home by sailing towards an island.'
b. *Pääsimme kotiin purjehtimalla {kohti saarta}* (no movement)
we.got home sailing towards island
'We got home by sailing towards an island.'

The syntax-centric view asserts that such pairs do not have to differ in meaning or in terms of processing load, say, since some operations take place independently "above the plane". Some mechanical, computational arrangement must be at stake. A champion of such a hypothesis must observe some syntactic, perhaps configurational property which always accompanies movement. It is not, of course, sufficient to stipulate that the mechanism must be syntactic. So the point of disagreement is empirical; and the correct answer is not known.

It is worth repeating that both views claim that syntactic operations can potentially *correlate* with meaning. Rizzi's chapter, to which we return later, shows how movement triggers specific discourse-related interpretations. This is possible in the generative theory, since the syntax-centric view posits close ties between properties of syntax and properties of meaning. "The fact that correspondence between formal and semantic features exists", Chomsky (1957) wrote, "cannot be ignored. These correspondences should be studied in some more general theory of language that will include a theory of linguistic form and a theory of the use of language as subparts" (p. 102). To repeat, the syntactic theory has *both* a syntactic and a semantic component, while the semantic-based theory only involves the latter.

Another perspective from which to analyze the situation is as follows. Recall that moving the relative pronoun directly from its base position to the left edge results in an ungrammatical string of words (2b, repeated here as 5a). Figure 5 illustrates the operation.

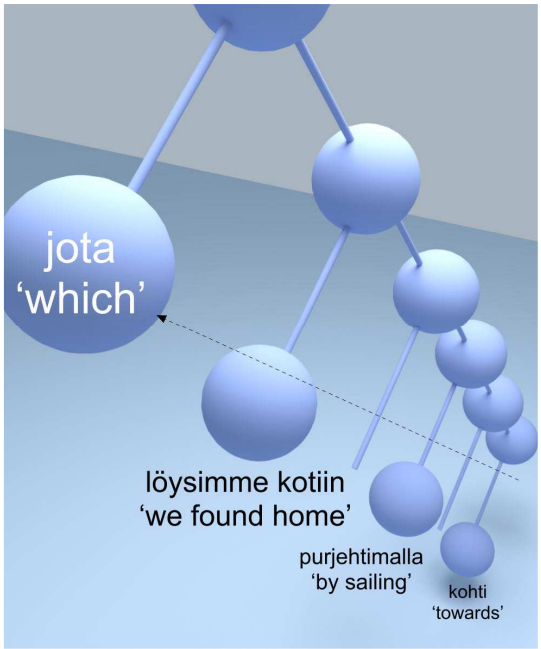

Figure 5. Extracting the relative pronoun directly without the help of intermediate dislocation leads into an awkward sentence in Finnish (and, likewise, in many other languages). This example is a graphical illustration of (5a). Example (5b) is structurally similar, but grammatically worse. (The representation is simplified in that the adverbial is most likely merged to the structure in a different manner, but this doesn't affect the main point.) This explanation assumes that there are syntactic mechanisms which build and move linguistic representations.

(5)	a.	*?*saari*	*jota*$_1$	*pääsemme*	*kotiin*	*purjehtimalla*	*kohti*	__$_1$
		island	which	we.get	home	by.sailing	towards	
	b.	**saari*	*jota*$_1$	*tavoitimme*	*heidät*	*purjehtimalla*	*kohti*	__$_1$
		island	which	we.reached	them	by.sailing	towards	

Ross (1967), in a seminal study of this type of data, suggested that in examples such as (5) the relative pronoun attempts to move out from a *grammatical island*. The term "island" refers to the fact that the pronoun is confined inside an environment (adverbial clause) from which it cannot escape. We must now look at several examples where something similar happens, and observe what they all have in common. If it's about semantics, then there must be something semantically impossible in configuring or grouping 'us', 'the island', 'sailing' and the 'directions' into a single coherent image or a mental representation, much like it is impossible to think about squared circles or colorless ideas (Figure 6).

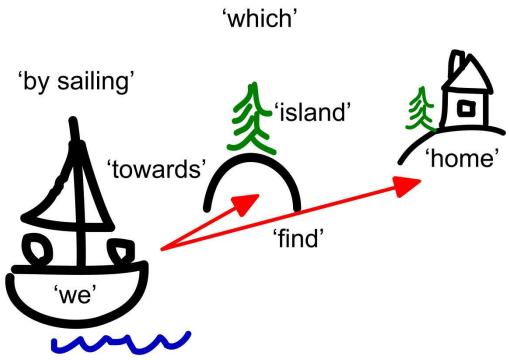

Figure 6. A possible semantic/picturesque representation of the example **jota löysimme kotiin purjehtimalla kohti __*, lit. which we.found home by.sailing towards __, which contains various conceptual ingredients such as 'we', 'home', 'sailing', 'finding' and directions. The assumption in anybody's theory must be that something like this may happen in the human mind when we produce and/or understand the sentence. The semantics-based theory will have to add that there must be some property P in this representation that prevents one to put the relative pronoun at the front of the clause, and the same property must then correspond to islands more generally. The property must be missing when extraction is possible, e.g. *towards which island did we think we would sail __ to find our way home?* Property P doesn't need to be semantic, it may have something to do with use, language function: anything that is not syntax *sui generis*.

In this way, we can always compare syntactic and semantic hypotheses, given a data fragment.

Turning now to the discussion of *wh*-movement in the present volume, López' chapter on "*Wh*-movement" mostly reads as a data-driven introduction to what is known about various *wh*-movement constructions and islands. The discussion assumes a syntax-centric view. There is a short introduction to the current minimalist theory of *wh*-movement, but most of the material is covered in a theory-neutral, easy-to-read form. I find López' distinction between proximal and distal causes of movement particularly illuminating. The distinction has to do with how to explain *wh*-movement. A *proximal explanation*, according to López, tells us what syntactic (or other) mechanisms implement the operation; distal explanation relates the phenomenon "to the functionality of language within the cognitive systems with which it interfaces". Let me first make a brief comment concerning the latter, following closely López' exposition.

Interrogatives or relative clauses transform canonical clauses in some ways.[6] A relative clause, for instance, denotes a predicate or property. Thus, the two relative clauses in (6a-b) designate different predicates.

[6] Pamela Munro (Chapter 8) addresses word ordering, concentrating on the typological distribution of various basic word orders (e.g., SVO vs SOV).

(6) a. *a car* ***which*** *Mary fixed* __
|----------|
(smaller predicate, 'Mary fixed x')
b. *a car* ***which*** *John thought Mary fixed* __
|----------|
(bigger predicate, 'John thought Mary fixed x')

Notice that (6a) presumes that Mary fixed something, while in (6b) it is only in John's thought that Mary did anything. Perhaps Mary did nothing. The difference comes to scope. In (6a), the predicate is 'Mary fixed x'. In (6b), the predicate is 'John thought Mary fixed x'.[7] It is of course not an accident that the relative pronoun *which* marks the beginning of the predicate. This might be its exact function. Movement is thus related to an operation which crafts predicates out of sentences, and, at least in these examples, it marks the beginning of the predicate. There is, therefore, a functional and/or semantic explanation. That explanation is "distal" in López' sense, as it situates to operations within a much broader communicative-cognitive context. (Remember again that the syntax-centric theory does *not* deny the existence of semantics; rather, it is the semantics-based theory which denies the existence of syntax.) In the generative nomenclature, we would say that the purpose of these computational operations is to craft something intelligible for the interface between syntax and semantics. It says: "Do this, and the semantic component will understand what you are doing". This would be a "distal" explanation, too.

The proximal explanation wants to say something of the actual mechanisms implementing these functional tasks. And there is much to say. By saying that movement marks the logical scope of the predicate we have said nothing concerning islands or snowballing, to begin with. The standard generative proximal explanation goes as follows. We begin from the assumption that the relative clause (or, an interrogative) is headed by a functional element, call it C(*wh*), which marks it as a relative clause and not, say, a declarative. C(*wh*) must be matched with the relative pronoun within its scope, like a quantifier must be matched with a variable in the standard Fregean logic. The relative pronoun represents the variable, the "unknown" part. Matching, which is a grammatical operation, may then be followed by movement. Movement, in turn, is a variant of Merge: an existing constituent is remerged or recycled, thus, merged again. Each step is a concrete computational operation performed on some phrase-structure representation. They are *designed to explain islands, snowballing, and other empirical phenomena related to wh-movement*. These assumptions are illustrated in Figure 7.

I want to emphasize once more that, once we admit that there are independent syntactic operations, the proximal explanations can be seen as a form of computational operations which *implement* these manipulations in a concrete sense. Distal explanations, in turn, can abstract away from the actual causal-cum-computational mechanisms and search for their place within a web of broader cognitive and communicative functions.

[7] Technically speaking, the relative pronoun marks the scope of the lambda-operator that binds the variable inside the phrase. The operator plus the variable constitute the predicate.

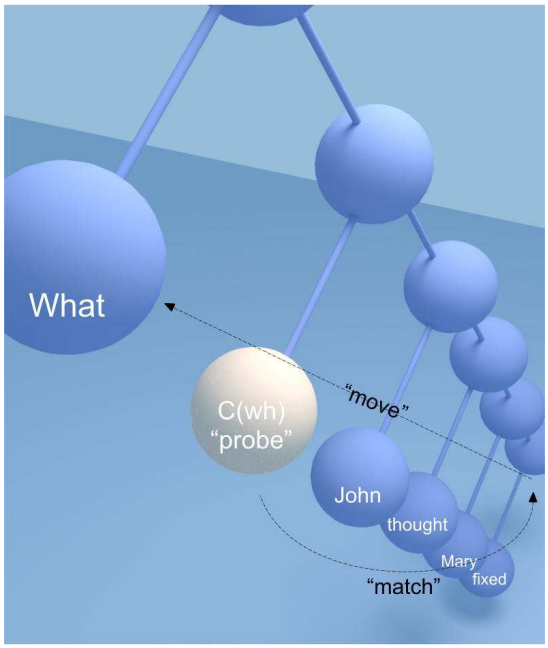

Figure 7. Proximal causes of *wh*-movement. The predicate is marked as such by the merge of a predicate-forming element C(*wh*). The element, a probe, is highlighted in some manner, alerting the derivation that it cannot proceed until certain operations have been performed. We can think that it transmits a distress signal. Thus, the element is matched with a variable downstream ("match" arrow). In some languages, and in some constructions, movement of the variable then follows ("move" arrow). That movement is plausibly just some form of remerge, thus, one constituent is merged twice: first to its base-position, and the later to a new position. The operations silence ("check") the probe, so that it will cease to transmit distress signals. Derivation continues. Islands, snowballing, *wh*-in-situ configurations and other observed phenomena are explained as byproducts of these computational-mechanical operations. Notice that the processes are computational: they operate on concrete structures, and obey strict structural limits.

Our discussion of *wh*-movement and the illustration in Figure 7 has left one particular but important detail without mention. We have looked at interrogatives and relative clauses, both constructions which require something to occupy the left edge position in Finnish and English. But phrases and words which are either topicalized or focused have similar tendencies. Topic represents givenness, something that is known by both the speaker and the hearer; focus represents new information. In Finnish, the left edge is associated with contrastive focus, as shown in (7).

(7) ***Pekkaa*** *Merja* *rakastaa* __, *ei* *Jukkaa*
Pekka.PRT Merja loves not Jukka
'It is Pekka who Merja loves, not Jukka.'

When the patient object of the verb *rakastaa* 'to love' is moved to the left edge in this way, it expresses the presupposition that the hearer (and possibly also the speaker) at first assumed that it was somebody else than Pekka who Merja loves, and the sentence denies this presupposed proposition and claims that, no, it was Pekka. Pekka is, in a sense, highlighted in this particular contrastive role. It is called contrastive focus/topic, because the sentence is contrasted against other sentences presupposed in the background. As example (7) shows, discourse interpretation is associated with the left edge of a clause, much like interrogativization and relativization. It is for this reason that the left edge is said to represent not only scope, but also matters related to discourse. In Chapter 26, Luigi Rizzi reviews what is currently known concerning such scope-discourse properties of the sentential left edge, paying particular attention to topic and focus. He discusses mainly Italian, a language where the left edge is known to consist of several functional projections, each associated with a particular scope-discourse interpretation. To the extent that this is true, a richer set of functional projections, called a "cartography", constitutes the clausal left edge. Thus, Figure 7 is a simplification: it only shows one left edge projection C(*wh*). But it might nevertheless be here, at the outermost edge of a clause, that language represents the attitude a speaker is taking towards the clause he or she wishes to utter or contemplate. The left edge perhaps functions as a 'gateway'

between the clause-internal syntax and clause-external world of discourse.

Wh-movement is, in short, a phenomenon with multiple dimensions and many faces. It presents a complex phenomenon that is challenging to analyze. I will conclude with López' words: "*Wh*-movement is one of the topics in generative grammar that has inspired the most literature. After literally hundreds of articles, theses, and books, we have learned many facts about its syntactic and semantic properties and cross-linguistic variation. However, there is great controversy as to how to put everything together in a comprehensive theory" (p. 312). Linguistics is still waiting for its own James Maxwell to distill the complex mess into a coherent, elegant and unified theory.

Giuseppe Longbardi and Giuseppina Silvestri (Chapter 7) review some aspects of the syntax of noun phrases, and mostly focus on the argument structure and its syntactic and morphosyntactic realization. The approach is cross-linguistic, with an emphasis on the genitive Case. It is written with a strong generative orientation, but in a manner that is likely to be helpful for typologists, too. If anything, this section show how complex issues a theory of syntax must deal with. Space constraints prevent me to discuss this complex topic. In approximation, the nominal domain is like a twisted clausal domain: there are in this domain argument structures, agents, patients, passivization, grammatical operations such as *wh*-movement, Case assignment, argument hierarchy, head movement, event tense – in short, many of the things we encounter in the clausal domain – but it all works strangely, as if the clausal template would be forced into a domain where it doesn't quite fit. It is, therefore, one of the long-standing problems to explain how the nominal domain relates to the clausal domain. Their similarities are obviously not accidental, yet there are also profound differences.

3 Lexicon

Expressions are made of word-like units. A complication in this proposition is that phonological words do not appear to be monolithic atoms, instead, they are constituted by morphological, syntactic and semantic parts. Often these parts manifest themselves in a semi-productive way, making it more difficult to disentangle the true laws from entropy. "Words are peculiar", Mark Aronoff wrote many decades ago, "not only in that not all of those that should exist actually do, but also in that those which do exist do not always mean what they are supposed to mean, or even look like what they are supposed to look like" (1976, p. 18). Take the English word *uneasy,* which is made of two components, *un-* and *easy*. Its composition suggests that it means 'not easy' or 'difficult'. Yet, it means something like 'uncomfortable'. Thus, "Words, once formed, persist and change; they take on idiosyncrasies, with the result that they are soon no longer generable by a simple algorithm of any generality" (p. 18).

A typical generative position is to assume that phonological words, when productively generated, are assembled out of lexical and functional information (morphemes, clitics) which emerge to the structure by the courtesy of Merge and are then "repackaged" into word-like units by grammatical processes (Figure 8).

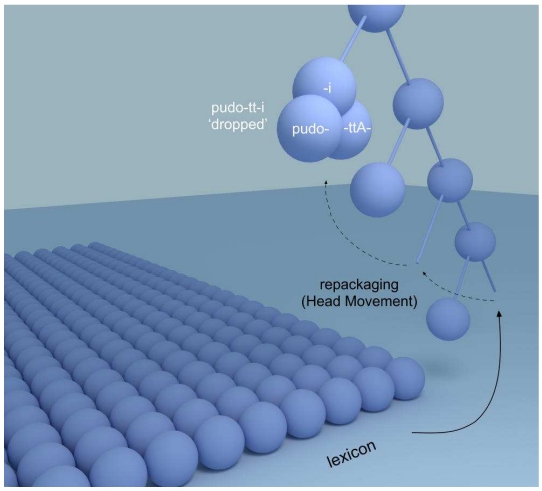

Figure 8. Phonological words are rarely monolithic atoms, instead, they are bundles of properties. These properties could be phonological, morphological, syntactic and semantic. In the generative theory, most such features are first merged individually to the structure from the lexical repository and then bundled dynamically, as shown in this figure. The figure shows composition of finite transitive verbs out of three elements: intransitive verbal head V, transitivizer verbal head v, and tense T. Some lexical items have complex structure already when they enter derivation. Gender features are a good example. One could claim that entries such as *uneasy* are produced in the lexicon, due to their idiomatic, non-compositional meaning. If so, then the lexical repository decipited here as a collection of linguistic atoms will contain complex bundles as well. Syntactic theories differ in how much initial, subsyntactic lexical structure they posit.

To illustrate word packaging, consider the fact that in Finnish, the negative word *e-* 'not' can be merged with the complementizer (8a-b).

(8) a. *Pekka uskoo että Merja ei rakasta häntä*
Pekka believes that Merja not love him
'Pekka believes that Merja doesn't love him.'
b. *Pekka uskoo ett-ei Merja __ rakasta häntä*
Pekka believes that-not Merja love him
'Pekka believes that Merja doesn't love him.'

The negative head moves up and joins the complementizer node one step higher, where they accompany each other together to constitute a single phonological word *ettei* 'that-not'. But why not say that the complex word *ett-ei* 'that not' is merged directly to the structure?

Heads which are on their way up in the structure must observe certain limits. For instance, they can only move one step at a time. They do not skip positions. In Finnish, if we insert an interrogative word between the complementizer and the negation, the process halts (9b). The negative word must now adjoin to the interrogative pronoun instead, because it occupies the next node up (9c).

(9) a. *Pekka pohtii että miksi Merja ei rakasta häntä*
Pekka wonders that why Merja not love him
'Pekka wonders why Merja doesn't love him.'
b. **Pekka pohtii ett-ei miksi Merja __ rakasta häntä*
Pekka wonders that-not why Merja love him
'Pekka wonders why Merja doesn't love him.'
c. *Pekka pohtii että miks-ei Merja __ rakasta häntä*
Pekka wonders that why-not Merja love him

This illegitimate movement is illustrated in Figure 9.

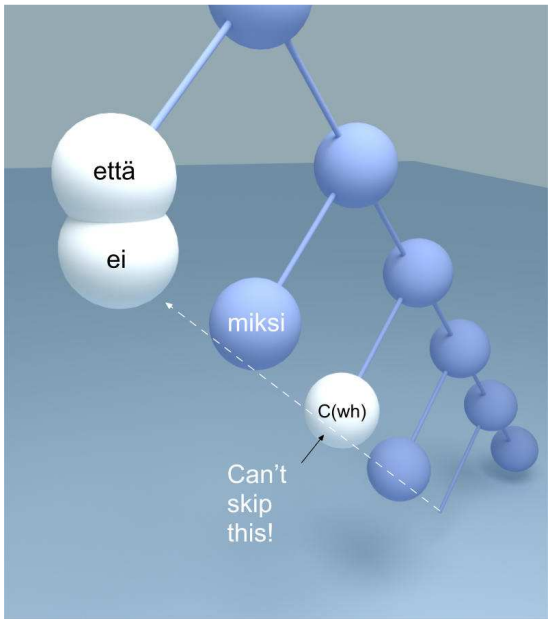

Figure 9. Movement cannot skip potential positions. Here the negative word wants to skip over the interrogative head C(*wh*) hosting the interrogative pronoun *miksi* 'why'. This produces an ungrammatical sentence. Instead, the negative word must be hosted by the interrogative. This produces *Pekka pohti että, miks-ei Merja rakasta häntä,* lit. Pekka wonders that why-not Merja __ love him.

This suggests that the process is syntactic, not lexical, as it observes independently motivated syntactic constraints. The question of how much lexical packaging is done by syntax and how much of it is accomplished by another means is much debated. Even the generative theory alone has taken several extreme and opposing positions, and hypotheses oscillate violently, partly because of the "basic trouble with morphemes", as pointed out by Aronoff: "Because words, though they may be formed by regular rules, persist and change once they are in the lexicon, the morphemes out of which words seem to have been formed, and into which they seem to be analyzable, do not have constant meanings and in some cases have no meaning at all. It is this persistence which forces us to adopt a lexicalist hypothesis" (p. 18). If we pay attention to these worries, one quickly notices that the problem is something construction grammar could easily accommodate.

There is no separate chapter on the morphology-syntax interface in the volume under review, however. Instead, the matter is distributed into several chapters dealing with various constructions such as passives and antipassives (Edward L. Keenan, chapter 14), middle and reflexive (Leonid Kulikov, Chapter 15), causatives (Jae Jung Song), and these chapters are, rightfully, oriented towards syntax. The discussion revolves around questions such as how lexical properties and mechanisms affect argument structures, case marking and semantics. The exposition is quite theory-neutral, perhaps geared towards the construction grammatical view.

4 Agreement and beyond

We have covered aspects of the lexicon, Merge/recursion and movement. The first provides the atoms, the second makes molecules, and the third rearranges both. There is a fourth phenomemon. When words are put together into complex arrangements in syntax, they interact with each other. We observe that depending on its position in the syntactic structure, a word may take different forms. Nouns are case-marked, verbal elements are marked for phi-features (number, person, gender, and the like).

In the generative theory, these interactions are conceptualized by means of Agree. Agree obtains between functional and lexical units, under which they exchange features (properties). Exchange of features leads to case assignment and phi-agreement. To take again a Finnish example, noun phrases in complement positions of many functional heads are assigned the partitive case (in the unmarked case), while noun phrases in the subject positions of finite-agreeing verbs are assigned the nominative case (example (10), Figure 10).

(10) *Pekka* *halusi* *syödä* *leipä-ä*
Pekka.NOM want.3SG to.eat bread-PRT
<---------> |---------->
AGREE(P,G) AGREE(P,G)

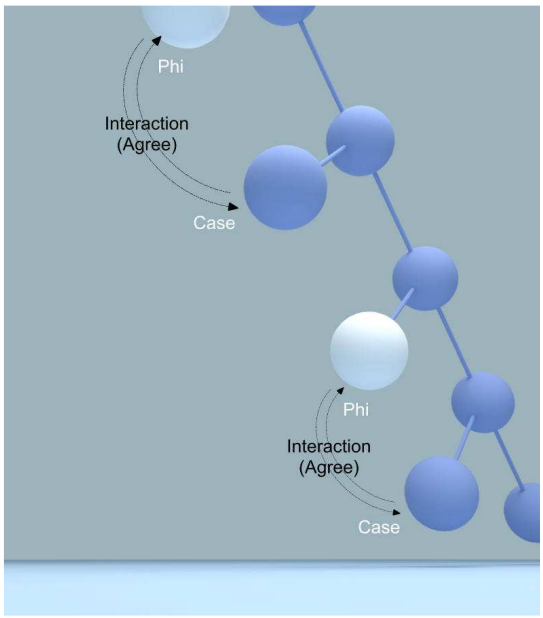

Figure 10. Agreement holds between syntactic objects, usually functional and lexical (or perhaps phrasal) items. The standard generative theory says that agreement causes noun phrases and functional heads to exchange phi- and Case-features, leading to what we refer in a theory-neutral sense as Case assignment and phi-agreement. Typically the interaction is depicted as a binary, one-to-one relation that is confined to local domains, here to structurally adjacent items.

Agreement is an essential ingredient of natural language syntax. But why? Agreement is like the magnetic force before Maxwell: everybody knows it's there, a lot is on record about what it does, but we don't know what it is and why it exists. Mechanisms of Agree are discussed in some detail in Chapter 21 entitled "Negation" by Liliane Haegeman and Terje Lohndal, in which the authors review some aspects of the syntax of negation and then concentrate on the interplay between negative concord and the theory of Agree.

What is under discussion in this chapter is the following. If we look at example (10) (see also Figure 10), it appears as if agreement would constitute a local one-to-one relation. The finite verb interacts with the subject, and the transitive verb interacts with the object. This provides an elegant and simple picture: you put constituents close enough, and they exchange properties. You put them too far, and they do not interact. In Finnish, this assumption turns out to be wrong, as shown by data such as (11).

(11) a. *Me* *näi-**mme*** *Merjan* *ottamassa* *lääkke-**en***
We.NOM saw-1PL Merja.ACC to.take medicine-ACC
'We saw Merja taking the medicine.'

b. *Me* *näh-**tiin*** *Merja* *ottamassa* *lääke-**0***
We.NOM saw.IMPASS Merja.NOM to.take medicine-NOM
'We saw Merja taking the medicine.'

Here the form of the finite verb, more exactly, its voice, affects the case forms of two direct objects, one of which is not local to the verb (Vainikka & Brattico 2014). In the recent generative theorizing, this situation has been handled by assuming that agreement can take a one-to-many form and thus instantiate a multiple agreement relation or Multiple Agree (12).

(12) a. *Me* *näimme* *Merjan* *ottamassa* *lääkkeen*
We.NOM saw.1PL Merja.ACC to.take medicine.ACC
|--------->
|-->
Agree(*näimme*, *Merja*) + Agree(*näimme*, *lääkkeen*)

One element at the top of the clause, the finite verb (or functional items therein) affects several elements downstream. Haegeman and Lohndal's concern is whether the negative polarity phenomenon should or should not be explained similarly. In Finnish, the negative word *e-* requires direct objects within its domain to be in the partitive Case, the accusative being impossible (13a). In addition – and this is what Haegeman and Lohndal address in their chapter by citing data from West Flemish – negative polarity item have similar properties (13b-c). It is as if the influence of the negation were "spreading" to several items across the sentence, or even over several sentences.

(13) a. *Me* *emme* *nähneet* **Merjan/Merjaa* *ottamassa* **lääkkeen/lääkettä*
We not.1PL see Merja.ACC/PRT to.take medicine.ACC/PRT
|------------------------>
|-->
'We didn't see Merja to take the medicine.'
b. *Me* *emme* *nähneet* *ketään* *ottamassa* *mitään*
We not.1PL see anybody.PRT to.take anything.PRT
|------------------->
|--->
'We didn't see anybody to take anything.'
c. **Me* *näimme* *ketään* *ottamassa* *mitään*
We saw.1PL anybody.PRT to.take anything.PRT

If this holds, then one item, negation, interacts with several items. Such interactions cannot be confined into local one-to-one domains after all. In contrast, Haegeman and Lohndal argue based on data from West Flemish that Multiple Agree runs into wrong predictions concerning negative concord and propose that agreement is, after all, a local one-to-one relation. Apparent multiple agreement patters are, according to this analysis, sequences of local agreement relations.

I discussed this chapter in detail because the controversy plays a pivotal role in recent theories of syntax. The question is whether grammatical dependencies are *always* local. Consider again the following two phenomena: relative pronoun movement (2a-b) and head movement (6a-c). Relative movement triggers snowballing, as the pronoun

climbs higher and higher in the structure (14a). The relative pronoun moves, takes the rest of the phrase with it, and moves again, until the whole party reaches the destination. Head movement, likewise, collects adjacent items as it curls up (14b).

(14) a. *saari* {{*jota kohti* __} *purjehtimalla* __} *pääsemme kotiin* __
island which towards by.sailing we.get home
b. *Pekka tiesi ett-ei Merja* __ *rakasta häntä*
Pekka knew that-not Merja love him

If we pause here for a moment, it is easy to see that these examples have something in common. Both operations target the closest position available and, as we have seen, ungrammaticality results when a potential target position is skipped. At least since the early 1990s it has been theorized that these and similar limitations are due to a general, perhaps even a supramodal "least effort" principle according to which syntax minimizes effort. This would then explain why movement operations must target the closest possible position, and why skipping is rejected. When you are tired and climbing up the stairs, you might not want to put up extra effort and skip steps. Perhaps syntax is like that. It is against this background that nonlocal and multiple agreement patterns are particularly interesting: they provide a way to test this prediction empirically. They constitute key specimen in assessing the hypothesis that language is lazy.

The hypothesis that language is lazy, in turn, constitutes an essential part of the recent *minimalist theory of grammar*. Vieri Samek-Lodovici discusses minimalism in Chapter 27. He makes a novel and intriguing proposal, namely, to use the optimality theory (OT) as a framework for minimalism. But let us first go back in time to try to see what is at stake. In an interview conducted around 1979-80, Chomsky says that "it might be a fundamental error to search for too much elegance in the theory of language". He was concerned with the possibility that the neural systems supporting linguistic processing "developed the way they did in part accidentially" (Chomsky 2002, p. 56), and would, therefore, be inherently messy, redundant and full of quirks and ad hoc mechanisms. Perhaps the brain does contain, as a consequence of its long and accidental evolutionary history, considerable amount of irreducible entropy. Indeed, as pointed out by Chomsky, this was a serious possibility; I think it still is.[8] Enter the least effort principle: if it's true that several grammatical processes can be attributed to an underlying least effort property, then it might be that there is much less randomness in language than what there could be.

This hypothesis invites another idea. The hypothetical least effort principle is certainly of such a character that it does not need to be syntax- or even language-specific. There is certainly nothing inherently language-specific in optimality. In other words, the least effort properties have an independent motivation, a language-external constitution if you will, that need not refer to linguistic categories specifically. The Minimalist Program (Chomsky 1995) is an attempt to find what's at the other end of this road if we desire to see it through: how much of natural language, syntax in particular, can be explained by assuming independently motivated, language-external factors?

Well, how much? By asking this question we have arrived at the horizons of current understanding. We don't know. Due to its omnipresence, most of the field is currently pushing towards proposing minimalist analyses and using minimalist notions, whatever data one happens to stumble upon. Since it's a research program, it is immune

[8] The matter is discussed in Brattico (2008), where I defend the idea that with regard to many aspects of human cognition, this might be a realistic (and somewhat pessimistic) scenario.

to refutation. Research programs are inevitably established and explored, until they are exhausted and abandoned by future generations. Thus, there being so much minimalist theorizing is not, in and itself, indicative of anything substance-wise. It will be an interesting journey to see where it works and where it doesn't. Samek-Lodovici's contribution, though, is to inject an OT-style conflict resolution mechanism to the minimalist architecture of grammar. The idea is that linguistic constraints or principles are first allowed to conflict inside what appears to be quite standard minimalist architecture, and the expression (derivation) involving the least amount of conflict will be generated. In other words, a global conflict resolution algorithm is added on the top of an existing minimalist theory. He illustrates the hypothesis by explaining properties of the Italian left edge by using an OT-style analysis. This is one possible path for pursuing the minimalist vision. I have seen data from Finnish which could potentially support it. Hence the proposal is interesting, but not a small matter, since global conflict resolution, too, requires a proximal, causal mechanism for its support.

Thus we have arrived at where the matters stand today or so I believe. Few years into the future, and I hope this review, like much of the research that motivates it, will be perceived as dated.

5 On acquisition

Maria Teresa Guasti (Chapter 23) provides a short survey on the topic of language acquisition. The question is how all these and other operations are acquired during the first few years of human development. The question is relevant historically. During the structuralist-behaviorist era, it was assumed that languages constitute arbitrary collections of learned structures. This view went hand-in-hand with the belief that languages are fundamentally simple things, much like behaviorists believed that humans are like pigeons. What happened when rigorization took place was that languages suddenly did not look simple at all. It is impossible to deny today, given the amount of published research, controversy, and huge volumes of scientific literature, that languages are, in reality, complex things. The present volume is one testimony to that proposition. The reason this goes with the strong nativist position is that if it took the whole mankind several thousand years to discover something as simple as *wh*-islands, not to speak of all those syntactic phenomena filling the pages of scholarly literature, it makes no sense to assume that every human child somehow "reasons" all that out during his or her first few years, whether his learning abilities are equivalent to pigeons or to adult cognition.[9]

How is it possible for every child to acquire something so complex that adults cannot, by looking at the same evidence and beyond, understand its principles? We must, of course, provide the child with a rich structure to begin with, such that it will guide him

[9] One objection I've seen goes back to the structuralist position and claims that syntax is, against all the evidence in the scholarly literature, simple. Another possible objection grants children some form of magical rationality, something adults lack. Tomasello (2003) advances both claims. According to him, "children have at their disposal much more powerful learning mechanisms than simple association or blind induction" while "there exists plausible and rigorous theories of language that characterize adult linguistic competence in much more child-friendly terms than does generative grammar" (p. 3). Indeed there exists. But if children are so clever, and languages are so simple, we adults must be totally inane to waste taxpayers' money on writing companions after companions to things like whether *wh*-movement is at root syntactic or semantic. Something doesn't add up.

or her towards the adult state without missteps. But it is here that the complexity of language provides a challenge. "Recognition of the unsuspected richness and complexity of the phenomena of language created a tension between the goal of descriptive and explanatory adequacy", Chomsky (1995, p. 4) noted, referring to the opposing requirements of describing natural languages in all their complex and individual glory and of providing the one, rich, innate and universal initial structure every human child must be endowed with to succeed in the acquisition task. The first factor presses one to describe every language as its own complex world, while the second suggests that all language must be, at bottom, just the same. "This tension", Chomsky continues, "defined the research program of early generative grammar" (p. 5).

The implication is that languages should be similar to each other. Of course they are. I know of no language where, for example, a *wh*-pronoun could be extracted out of a relative clause, in a manner illustrated in (15).

(15) **Mitä Pekka tapasi miehen, joka korjasi __?*
what Pekka met a man, who fixed
'which x such that Pekka met a man, who fixed x'

This sentence is just horrible. But suppose that such a language were attested. Still, most languages do prevent extraction from a relative clause and this cannot be a coincidence. If unrelated languages exhibit identical properties, there is virtually nothing short of a miracle to explain their presence except an innate factor. Guasti illustrates these questions surrounding the mystery of language acquisition by looking at empirical evidence concerning the acquisition of three phenomena: word order, displacement (*wh*-movement and relativization) and locality.

5 On methodology

The first four chapters of the volume under review deal with linguistic methods and methodology. William Croft criticizes certain methodological maxims underlying linguistic analysis, generative linguistics in particular, and proposes a "rigorous, justifiable method" (p. 19). Much of that method comes down to a requirement that hypotheses should be validated cross-linguistically in various ways (items 1, 2, 4 and 5 on pages 19–20), plus a requirement that distributional patterns should be examined "in detail" (item 3). In addition, Croft is skeptical concerning the cross-linguistic utility and validity of syntactic notions, and proposes that linguistic universals should be distilled from semantic-functional concepts. As an example, he suggests we should give up making cross-linguistic generalizations based on the shadowy notion of "adjective", and use "words that denote property concepts" instead (p. 21). We are by now familiar with these themes, as they were discussed in the earlier portion of this review. I find much to recommend here, and again there are good historical precedents. Before Kepler, astronomers were assuming planetary orbits to be perfect circles. It was only after analyzing huge blocks of obscure astronomical data (coming down from Tycho Brahe) and painstakingly aligning one hypothesis after another over that dataset that Kepler was able to see that the orbits are elliptical, not perfect circles. That is, the crucial step was possible because Kepler followed Croft's maxim: analyze all data available in full detail.

Whether such a thorough analysis will lead into anything useful is somewhat context-dependent, however. There are examples of data torture that have led nowhere,

and occasions when what looked like extremely narrow experimentation or observation has resulted in a breakthrough. Of the latter, a good example is Max Planck's discovery of quantum mechanics (hence transistors, computers, satellites, and so on). That happened when he examined an idiosyncratic phenomenon called black body radiation, a peripheral corner of "physical reality". The fact that it was such an extremely narrow phenomenon which opened the gates for a revolution was, furthermore, completely accidental. My understanding is that most of the interest in the black body radiation at that time was based on an industrial desire to build efficient light bulbs. Planck nevertheless had some odd results to explain. When he was willing to surrender to the weight of the observations, physics entered a new quantum era. It is therefore also true that an "intensive study of particular languages", as noted by Chomsky (1982), can "give deeper insight into UG than less far-reaching study of a wide variety of languages" (p. 92).

Marianne Mithun discusses field methods in Chapter 3. "In my own work, after recordings have been made", she observes (p. 33),

> . . . I typically work through the material with one or more speakers phrase by phrase, to transcribe, analyze, gloss, and translate it. In the course of such work, speakers provide a check on the acceptability of the forms used and can point out inter-speaker variation. They have insight into the meaning of what is said beyond literal translations. They can untangle reference. They can provide the back story behind discussions that would make little sense otherwise. They may comment on the semantic and social implications of certain structural choices. For me, the most interesting discoveries about syntactic structure tend to emerge from this work.

This constitutes a holistic, open-minded and innovative way to interact with the informants, there being no aprioristic regulations or limits on acceptable procedure. Why should we block syntactic, semantic, pragmatic, cultural or extralinguistic intuitions and observations from entering our theorizing? In a similar open-ended way, Mark Baker (Chapter 2) talks about "Hypothesis Testing in the Minimalist Program" (Chapter 2), taking notes of similarities and differences between naturalist (generative) linguistics and natural sciences, while Maria Freddi addresses corpus methods (Chapter 4). I learned from both chapters.

All in all, the book has been an interesting and inspiring read. Syntax is a lively, flourishing and an important field of study, with many results to its name. But what we currently have is only a beginning.

References

Aronoff, Mark. 1976. *Word Formation in Generative Grammar*. Cambridge, MA.: MIT Press.

Brattico, Pauli & Liikkanen, Lassi. 2009. Rethinking the Cartesian theory of linguistic productivity. *Philosophical Psychology 22(3)*: 251–279.

Brattico, Pauli. 2008. Shallow reductionism and the problem of complexity in psychology. *Theory & Psychology, 18*: 483–504.

Brattico, Pauli. 2010. Recursion hypothesis considered as a research program for cognitive science. *Minds and Machines 20*: 213–241.

Chomsky, Noam. 1957. *Syntactic Structures*. Mouton: The Hague

Chomsky, Noam. 1977. On Wh-movement. In Peter W. Culicover, Thomas Wasow & Adrian Akmajian (eds.). *Formal Syntax*. New York: Academix Press. 71–132

Chomsky, Noam. 1995. *The Minimalist Program*. Cambridge, MA.: MIT Press.
Chomsky, Noam. 2004. *The Generative Enterprise Revisited*. Mouton: The Hague.
Fukui, Naoki & Zushi, Mihoko. 2004. Introduction. In Chomsky, Noam. *The Generative Enterprise Revisited*. Mouton: The Hague. 1–25.
Huhmarniemi, Saara & Brattico, Pauli 2013. On primary and secondary movement. *Acta Linguistica Hungarica 60*: 173–216.
Huhmarniemi, Saara. 2012. *Finnish A'-movement: Edges and islands*. Institute of Behavioural Sciences, Studies in Cognitive Science 2, University of Helsinki.
Poincaré, Henri. 1905. *Science and Hypothesis*. London: The Walter Scott Publishing.
Ross, John Robert. 1967. *Constraints on variables in syntax*. Dissertation, MIT.
Tomasello, Michael. 2003. *Constructing a Language: A Usage-Based Theory of Language Acquisition*. Cambridge, MA: Harvard University Press.
Vainikka, Anne & Brattico, Pauli 2014. The Finnish accusative: long distance case by agreement. *Linguistics 52*: 73–124.

Pauli Brattico
pauli.j.brattico@gmail.com