



## Interviews

### **Cartography, Left Periphery and Criterial Positions: an interview with Luigi Rizzi**

#### *Cartografia, Periferia Esquerda e Posições Criteriais: uma entrevista com Luigi Rizzi*

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#### ABSTRACT

*In this interview Luigi Rizzi discusses the ‘heuristic capacity’ of cartography and the functional lexicon, reinforcing important empirical issues for syntactic theory. Among the issues addressed by Rizzi are the tension between invariance and variation, the relations between cartographic representations and phase theory, the parametrization, the structural backbone and recursion, the criterial approach and freezing and the “future” of Cartography.*

**Keywords:** *Cartography; Left Periphery; Criterial Approach.*

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**RESUMO**

*Nesta entrevista, Luigi Rizzi trata da capacidade heurística da cartografia e do léxico funcional, reforçando questões empíricas importantes para a teoria sintática. Entre as questões abordadas por Rizzi estão a tensão entre invariância e variação, as relações entre as representações cartográficas e a teoria de fases, a parametrização, o esqueleto estrutural e recursão, a abordagem criterial e congelamento, e o “futuro” da Cartografia.*

**Palavras-chaves:** *Cartografia; Periferia Esquerda; Abordagem Criterial.*

Luigi Rizzi is Full Professor of Linguistics at the University of Siena. Nowadays, he is Honorary Professor at the Collège de France. Recently, he was on the faculty of Department of Linguistics at the University of Geneva. Professor Rizzi researches the syntactic theory and the comparative syntax of Romance and Germanic languages. In particular, he contributed to the development of the parametric approach to syntactic comparison, to the theory of locality, to the study of syntactic representations, with special reference to the cartography of syntactic structures. He also works on language acquisition, with particular reference to the development of morphosyntax in the child, and on the role of the theory of locality in language development.

Professor Rizzi is one of the founders of the Interdepartmental Center of Cognitive Studies on Language (abbreviated as CISCL, in Italian) located at University of Siena. The CISCL coordinates studies on theoretical, descriptive and experimental language in a cognitive science perspective; it particularly promotes interdisciplinary research on language, conducted through the integration of techniques and concepts of linguistics, of the philosophy of language and of the mind, and of the other sectors of cognitive sciences interested in language (for more information, see the website <http://www.ciscl.unisi.it/>).

The project *Syntactic Cartography and Locality in Adult Grammar and Language Acquisition* (SynCart), funded by an ERC Advanced Grant at the University of Geneva, has Luigi Rizzi as the main investigator. The project aims to break new ground in syntactic theory, comparative syntax and acquisition by combining three main strands of research: (i) the cartography of syntactic structures, which attempts

to draw detailed maps of syntactic configurations; (ii) the theory of syntactic locality, with special reference to intervention and delimitation principles; (iii) the minimalist investigation of the fundamental ingredients of syntactic computations (for more information, see the website <https://www.unige.ch/lettres/linguistique/syncart/home/>).

Luigi Rizzi is honorary member of the Linguistic Society of America, Corresponding Fellow of the British Academy, member of Academia Europaea, honorary member of the American Academy of Arts and Sciences. He was awarded the International Research Chair Blaise Pascal (Paris) in 2011. The Professor Rizzi has contributed strongly to the research of the formal syntax of natural languages. We can highlight the books *Issues in Italian Syntax* (1982), *Relativized Minimality* (1990) and *Comparative Syntax and Language Acquisition* (2000). The article “The fine structures of left periphery” (1997) was a landmark in the investigation of the phenomena that involve the CP domain. *The Structure of CP and IP: The Cartography of Syntactic Structures*, book edited by Rizzi (2004), gathers a select group of syntacticists who focus the structure of the clauses, with special reference to the inflectional domain and the left periphery of the clause. This book has a substantial value to comparative syntax and for all linguists interested in contemporary research in generative grammar.

In this interview, Professor Luigi Rizzi discusses the ‘heuristic capacity’ of cartography and the functional lexicon, reinforcing important empirical issues for syntactic theory. He deals with tension between invariance and variation, a striking property of natural languages. Rizzi mentions the relations between cartographic representations and phase theory, and he still treats the basic conceptual and formal tenets of minimalism and the cartographic projects. Professor Rizzi still speaks about the parametrization, saying how we can distinguish the different types of languages that we observe. He also addresses issues that involve the structural backbone and recursion, as for instance, the uniqueness of focus versus the recursion of topics in the sentence. *With respect to the criterial approach and freezing*, Luigi Rizzi discusses some interpretive properties of subject and topic. The interview ends with Rizzi talking about the “future” of Cartography. In this moment, he aims what would be the most promising lines of research in the syntax area.

## Cartography and Functional lexicon

**Sandra Quarezemin (SQ):** The cartographic enterprise involves a large descriptive and comparative dimension: in the first place, we want to know what the right structural maps are for the different zones of the syntactic tree, and what kinds of invariant and variable properties of the maps we can find across languages. Rizzi (2018: 149) argues that “this dimension has shown a strong heuristic capacity, leading to much work on numerous languages, and to the identification of cross-linguistic generalizations”. According to the ideas defended in Cinque & Rizzi (2010), Rizzi & Cinque (2016) e Rizzi (2017), how can the cartography become a powerful generator of empirical issues for syntactic theory?

**Luigi Rizzi (LR):** In my view, an important dimension along which an approach can be evaluated is its heuristic capacity. I mean by that the capacity to generate new research, more theoretical and descriptive work, make new discoveries, and also, last but not least, raise new questions which can make the field advance. The early years of my activity as a linguist coincided with a major turning point in theoretical linguistics, with the advent of the Principles and Parameters model in the late 1970’s, a model which crystallized with Chomsky’s book *Lectures on Government and Binding* (1981), and with many other publications in that period. The P&P model proved to have a spectacular heuristic capacity. The model introduced a conceptually and formally simple idea which could address a striking property of natural languages, the tension between invariance and variation: on the one hand, languages appear extremely variable at all levels of linguistic description; on the other hand, if looked at a sufficient level of abstraction, they appear to be cast in the same mold, with structured batteries of universal properties, and clear limits on possible variation. Previous approaches, including previous forms of generative grammar, privileged either invariance or variation, to the detriment of the polar opposite: but the fact is that both aspects are essential in human language. The P&P model integrated in a single system two devices expressing invariance and variation, and this made it possible to develop comparative syntax on a large scale. These innovations very quickly generated a wealth of research on individual languages, including languages which had little or no tradition of formal studies. In a few

years, from the early 1980's on, the empirical basis of linguistic theory was extraordinarily enriched.

This impact is the model I have in mind when I mention the heuristic capacity of cartography, keeping the due proportions. Once the analysis of the fine details of syntactic configurations is put to center stage, this endeavor can promote a lot of research on individual languages and dialects, also leading to refined descriptions of understudied systems, and the discovery of new generalizations. This new and detailed body of knowledge can nourish theoretical research in decisive ways, illuminating previous issues and creating new theoretical puzzles. Let me just quote one broad issue, the relations between cartographic representations and phase theory. If the structure of the clause and of the left periphery involves the rich cartographic representations argued for in Rizzi (1997) and Cinque (1999) and much subsequent work, the question arises of which nodes define phases. I.e., Chomsky's (2001) claim that C is a phase-defining node must be restated by investigating which node(s) of the expanded left periphery defines the clausal phase. The same issue arises for the vP phase, in view of a plausible proliferation of v's with different qualities (Ramchand 2008), and the proliferation of functional heads in the low functional structure of the IP (Belletti 2004). Similar issues arise in connection with cartographic representations of the DP, PP, AP, etc. The issue of reconciling phase theory with cartographic representations remains largely to be explored. What is clear is that the functional sequences emerging from cartographic studies offer many more options to play with than traditional, more impoverished representations.

This is just one of the many examples that could come to mind. Another class of cases, which I partly explored in recent work, is offered by the observed functional sequences themselves: why do the observed ordering properties hold, rather than other imaginable orderings? Why do certain properties in the sequences remain constant, whereas other properties are variable? These empirical findings call for a deeper explanation of the observed properties, one which plausibly mobilizes principles of locality, principles ruling the interfaces with sound and meaning, possibly principles of labeling, etc. It is likely that by addressing such new empirical problems we will find out that these principles need refinements, perhaps in some cases entirely novel

approaches. In my opinion, this kind of enrichment of the empirical basis of theoretical work is of vital importance for the survival of formal syntax: in the absence of such a constant enrichment and exchange with the empirical dimension, the theoretical work risks to become sterile, and not raise enough interest in the scientific community.

**SQ:** In the debate between Rizzi & Kratzer (2020), realized during the EISSI, in June 2018, at the Universidade Federal de Santa Catarina (Florianópolis), you said that you do not see any kind of opposition between Minimalism and Cartography. At the time you defended a clear complementarity in the sense that Minimalism really focuses on the fundamental computational ingredients, on the elements of syntactic computation, while a Cartography focuses on the characteristics of the structures that are generated by these mechanisms. Actually, what cartographic studies try to show is that the functional lexicon is very rich. Considering this statement, one important empirical issue which appears is described by the following question: how rich is the functional lexicon?

**LR:** I do not see any kind of incompatibility between basic conceptual and formal tenets of minimalism and the cartographic projects. In fact, all the cartographic research I know of adopts merge as the fundamental derivational engine, assumes a search (agree) operation, assumes principles of economy and locality, particularly intervention locality. A phase-based mechanism is fully consistent with cartographic research: the important theoretical issues that I mentioned in the answer to the previous question constitute a potentially important enrichment for phase theory, not a threat. Whatever the right story turns out to be on interpretability of feature, it should be incorporated in cartographic research, I do not see why it should not. There are of course specific analytic choices which are particularly congenial to cartographic research, but they are within the range of options considered in minimalist research: for instance, uniqueness of complements and specifiers, and a ban on phrasal adjunction are normally assumed, much as in Kayne's (1994) antisymmetric approach. It is typically assumed that search (agree) is a prerequisite for internal merge, much as in Chomsky (2000); should it turn out that the evidence supports the view according to which internal merge is free and dissociated from Agree, just a subcase of merge without any

precondition, as in Chomsky, Gallego & Ott (2018), so be it! These are high level theoretical and empirical questions, whatever story turns out to be on the right track in case of such major theoretical bifurcations, it will have to be incorporated in cartographic projects, much as in the main body of minimalist research.

Having said that, it is clear that a typical cartographic tree looks much richer than the trees that appear in mainstream minimalist publications. In fact, a core discovery of cartographic research is the existence of rich functional sequences which characterize the main zones of the syntactic trees. Is this a point of substantial theoretical disagreement? I do not think so. As far as I can tell, there is no deep (or shallow) minimalist principle which restricts the clausal structure to a C-T-v-V system, the nominal structure to a D-N system, etc. The size of the functional lexicon is an empirical issue, much as the capacity of functional elements to get organized forming complex sequences. A significant contribution of cartographic studies is that, if one looks seriously at the details of syntactic structures, one is led to postulate a functional lexicon with hundreds of items, a conclusion which converges with estimates on potential “targets of grammaticalization” in typological research (see Rizzi & Cinque 2016 for discussion). A related contribution is that such items can combine in ways that are largely uniform across languages, giving rise to stable “molecular” structures, the functional sequences. In my opinion, the empirical evidence supporting such structures is massive, and holds across languages.

The discovery of functional sequences is not necessarily inconsistent with the minimalist practice of using impoverished C-T-v-V, D-N representation. There is no inconsistency if one looks at such impoverished representations as involving abbreviations of much richer functional sequences. It is a matter of adopting the optimal level of magnification for the particular argument one is developing. Analogously, certain aspects of the physical world are optimally addressed at the molecular level, and other problems require shifting to the atomic level. For certain syntactic issues, stopping at a lower magnification of C-T-v-V systems is perfectly fine, whereas other arguments require a higher level of magnification.

## Parameterization

**SQ:** At your Opening Conference during EISSI, it was shown that languages vary in certain syntactic aspects. Wh movement, for example. Languages in which everything gets moved to the left periphery necessarily, languages in which one element is moved to the left periphery, and then you have several elements *in situ*, languages in which all the elements are *in situ*. Languages which do not simply allow for multiple WH elements to occur in a structure. How do we distinguish the different types of languages that we observe?

**LR:** There is a lot of debate about how wh *in situ* should be analyzed. What seems to be clear is that we want LF representations for *in situ* sentences which are identical, or close, to LF representations for *ex situ* sentences, i.e., with operator – variable structures. Then this can be achieved in different ways: with “covert” movement, fully mimicking overt movement, as in Jim Huang’s original approach to Chinese, or through feature movement (Chomsky 1995), or through unselective binding by a Q head (as in Dylan Tsai’s approach), or through syntactic movement of a null operator (Akira Watanabe), or through combinations of these devices (David Pesetsky). I think that a minimal common denominator that all these approaches have is that there must be a search operation starting from a Q head in the periphery of the clause which probes a clause internal wh-operator. Then, some additional operation may be required, but at least this initial step must be postulated.

Then, there is the question of the uniqueness of overt wh-movement in some languages, like English. This is the expected case, if there is a unique Q head in the LP, and specifiers are unique. Languages permitting and requiring movement of all wh element like Hungarian, or Rumanian (i.e. languages in which *who said what?* comes out as something like *who what said?*) require something else: for instance, that the Q head is recursive, or that each wh element can function as a probe for another wh element, etc. These hypotheses make distinct predictions, which could be tested in languages with the right properties (for instance, languages with overt Q heads and allowing multiple movement: would we find a single Q or a multiplicity of Q’s in multiple questions?). And then there are languages that do not like multiple questions. So, some



parametrization must be involved here, too. Whatever it is, perhaps it is a shallow, easily readjustable parameter. I say this because when I was a student, in the 1970's, my Italian did not seem to allow multiple question, and I could hardly understand multiple questions in English. In current Italian text, multiple questions are sometimes found, and speakers (myself included) find them tolerable, if unusual, possibly under the effect of the relatively (more) common use in English. Here the analysis of large corpora may reveal if indeed the language has changed in this respect.

**SQ:** According to uniformity assumption (Chomsky 2001), is it possible to state that all languages involve a system of criterial heads, and what varies is the morphological realization of these heads?

**LR:** Under the criterial approach, the left periphery is populated by a system of functional heads, such as Top, Foc, Q, etc., which attract an element to their Spec, thus creating criterial configurations which are then interpreted at the interface as Topic-Comment, Focus-presupposition, etc. We observe that some languages have overt markers for topic, focus, Q, as shown, for instance, in Enoch Aboh's seminal work on Gungbe (Aboh 2004), and in many cases there is clear evidence (e.g., along the lines of Rizzi 2013) that the marker is part of the clausal spine. The natural move is to assume that these languages simply make the criterial Spec-head configuration overt. Other languages do not overtly realize the criterial head, but the syntax of the construction is the same, the only difference involving the overtness of the criterial head, a low-level parametric property. All this is in the spirit of Chomsky's Uniformity Principle, which states that the initial assumption in comparing languages is uniformity: the differences, which obviously exist, should be linked to very visible properties, i.e., postulated parameters should be easily fixable by the language learner. Chomsky stated the uniformity principle in the article on phases in 2001, but the assumption of a fundamental uniformity has been the leading idea of modern comparative syntax: if you initially assume uniformity of the systems you compare and you progressively weaken that assumption on the basis of the empirical evidence, you will end up with a clear picture of invariance and variation. If you start from the opposite assumption, that languages can be indefinitely variable and each language should be described without taking into

account the descriptions of other languages, you will end up with a disparate collection of grammatical descriptions, which will make the fundamental goal of capturing invariance and variation unattainable.

### Structural backbone and Recursion

**SQ:** According to the left periphery of the sentence (Rizzi 1997), few functional categories seem to be recursive (e.g. Topic), others cannot (e.g. Focus). The structural backbone is rich but basically finite functional phrasal structure. Topicality seems to be an exception because clearly we can have recursion. Why is it that topic should be exceptional? Is it possible to say that uniqueness of focus can be related to properties of PF interface?

**LR:** The recursion of topics may not be completely unique. Many languages permit multiple preposings of adverbial elements, which are not real topics. Some languages permit multiple wh-movement, as we have seen. A few languages have multiple subject constructions (e.g., Japanese). Nevertheless, there is a clear tendency: in a functional sequence, a functional head tends to occur only once. Whether this is a rather loose “non-redundancy” guideline, or there is room for a stricter principled approach, this is not clear to me, at the moment. In specific cases, though, I think a principled approach is called for. For instance, for the striking contrast between left-peripheral constructions for topic and focus: many languages permit multiple left peripheral topics, but I don’t know of any clear case of a language allowing multiple left peripheral foci. Even languages permitting multiple wh-movement, like Hungarian, do not allow more than a single occurrence of focus movement.

In my (1997) article, I proposed an account of the necessary uniqueness of left-peripheral focus based on the LF interface. The left peripheral Foc head triggers the interpretation of its Spec as focus, and of its complement as presupposition: if we had recursion of Foc, the lower focus would be part of the presupposition of the higher focus, and this gives rise to an interpretive clash which rules out the construction. No such clash arises in the case of topic recursion: “comment” is a rather weak notion, just about any clause containing new information

can constitute a comment, and nothing in this very broad interpretive requirement precludes a comment which in turn has a topic-comment articulation. This approach does not go without problems, but I still think it compares favorably over alternatives.

One imaginable alternative, mentioned in the question, could involve the PF interface: perhaps focus and presupposition have intonational contours that are incompatible. This approach is, I think, too weak to predict a general ban against a double left peripheral focus in the same clause: intonational systems associated to criterial constructions vary significantly across languages, so that intonation does not offer a sufficiently robust and stable basis for a general ban (on intonational contours associated to criterial configurations, see Bocci 2013). An LF approach seems to me to be a more likely candidate for the general ban, as the relevant LF properties presumably are invariant. PF properties may be relevant for lower level generalizations, involving languages with similar intonational properties. I have tried to develop this argument in Rizzi (2018). I intend to go back more extensively to these issues in a book now in preparation.

### **Criterial approach and freezing**

**SQ:** The criterial approach to constructions expressing scope-discourse properties has played a crucial role in the cartographic study of the left periphery of the clause (Rizzi 1997 and much subsequent work). The expression of articulations in the A'-system such as topic-comment, focus-presupposition, operator-scope domain is normally associated to special scope-discourse properties. Rizzi (2005) and Rizzi & Shlonsky (2007) propose that the subject position corresponding to the EPP position of Government Binding syntax presents an interpretive property, relevant for scope-discourse interpretation. So, what property could be associated to a subject criterial position? What is the contribution of this position to interpretation?

**LR:** I think the special interpretive property going with the subject position in the high IP structure is “aboutness”: the event expressed by the predicate is presented as being about the subject. This interpretive element is clearly made visible by active-passive pairs. The same event

(say, a “kissing event”) can be presented as being about the agent in an active structure (*Mary kissed John*), or about the patient in the corresponding passive (*John was kissed by Mary*). Aboutness, in this sense, also affects the organization of discourse and, in certain cases anaphora resolution, as in the cases discovered by Andrea Calabrese: in certain configurations of complex sentences and across discourse, *pro* in full null subject languages like Italian picks out the aboutness subject of the previous sentence (Calabrese 1986).

Subjects and topics notoriously have properties in common. Aboutness may offer a valid key to capture the commonality: topics and comments are linked by an aboutness relation much as subjects and predicates are. Subjects and topics are not identical, though. Syntactically, movement to subject position is much more severely constrained than movement to topic position: basically, only the highest predicate-internal nominal can move to subject position, so that, e.g., passive requires a preliminary “smuggling” step to make movement of the patient possible (Collins 2005, Belletti & Collins, forthcoming). Movement to a topic position is much less severely constrained, as we can have object topics crossing over subjects. By contrast, at the interpretive level, topics are more constrained than subjects: topics require some kind of prominence in discourse (akin to discourse-linking, or partitivity) which makes them not felicitous in all-new contexts like answers to “what happened” questions. So, for instance in Italian you can answer a “what happened” question with an SVO sentence involving a preverbal subject, as in (2), but not a topic-comment structure as in (3) (expressed by clitic left dislocation, the language-specific construction which expresses topic-comment articulations in Romance):

- (1) Che cosa è successo?  
‘What happened?’
- (2) Un camion ha tamponato un autobus  
‘A truck hit a bus’
- (3) # Un autobus, un camion lo ha tamponato \_\_  
‘A bus, a truck hit \_\_’

So, a topic involves aboutness and prominence in discourse, whereas a subject only involves aboutness. Among other things, a contrast like (2)-(3) shows (along with many other kinds of evidence) that in Italian (and in other full null subject languages) preverbal subjects and topics must be kept separate: one cannot assume that preverbal subjects always are topics resumed by *pro*, as it has sometimes been argued.

**SQ:** According to Rizzi (2015a,b), the halting or transiting status of a position can thus be derived in a principled way, ultimately from the labeling algorithm and the maximality principle. If halting positions typically are criterial positions and the subject position is a typical halting site of movement, is it possible to think of a position with mixed properties (argumental and A-bar)? The classical distinction between A and A' movement has an impact on freezing?

**LR:** It is sometimes claimed that the A / A' distinction vanishes in minimalism, but I don't think this is correct. We need the distinction, for instance, to account for the fact that left-peripheral positions do not increase binding possibilities, e.g., a wh-moved object cannot bind an anaphor internal to the subject DP. So, wh-movement of the object, as in (5), does not improve the acceptability of (4), in spite of the fact that *which boys* c-commands *each other*:

(4) \* Each other's parents saw the boys

(5) \* Which boys did each other's parents see \_\_?

i.e., only c-commanding A-positions count for anaphor binding. On the contrary, movement to subject position (e.g. in raising) does extend binding possibilities:

(6) \* It seems to each other's parents that the boys are tired

(7) The boys seem to each other's parents [ \_\_ to be tired ]

So, we want to say that subject positions are both A-positions (and function as anaphor binders) and criterial positions (trigger the aboutness interpretation, are halting sites for movement, determine

freezing effects, etc.). Similar considerations could be built on the basis of the licensing conditions for parasitic gaps, which are typically not licensed by A-positions.

### The future of Cartography

**SQ:** I close this interview by asking the same question that Aquiles Tescari Neto (Professor at UNICAMP) and I asked Guglielmo Cinque (Tescari Neto & Quarezemin 2020): *in view of the state of the art in cartographic studies - and in generative grammar and linguistic typology -, what would be the “future” of Cartography, that is, what would be the most promising lines of research in this area of syntax?*

**LR:** First of all, cartography has a broad descriptive dimension. We now have a promising empirical coverage (see, e.g., the review in the SynCart site, set up by Giuliano Bocci, Karen Martini & Giuseppe Samo at the University of Geneva), but it should be clear that there is much room for progress here. Some languages and language families have been explored in some detail: Romance and Germanic, including a lot of work on dialects, but even there much remains to be done. Slavic languages have been explored cartographically with important results, but only on specific configurations (e.g., on multiple wh questions). Outside Indo-European, there is important work on Ugrofinnic and Semitic. Certain languages spoken in Africa have been analyzed in great detail in dissertations and books, often bringing illuminating contributions, and there is a satisfactory flow of dissertations, but what remains undescribed in the proliferation of languages and dialects of Africa is immense. Much work has been undertaken recently on Chinese and Japanese, which is also supported by an academic infrastructure and dedicated projects, e.g. with the biannual organization by Professor Fuzhen Si of the International Workshop on Syntactic Cartography at BLCU, Beijing (see Si, ed., 2017), the constitution of a cartographic Association in Macao, etc.; so, I expect this trend to continue to grow in the years to come. Languages spoken in other areas of the world have been analyzed cartographically in (often important) individual contributions, so the room for growth is also enormous on native American and Australian languages, Austronesian, etc.

I think one important contribution would be to start building user-friendly databases which would make easily available the great analytic work which has been done. In fact, SSWL (Syntactic Structures of the World's Languages), directed by Hilda Koopman (UCLA) already makes available some elements of cartographic analysis across languages. In short, it is clear that the descriptive dimension of cartography is an open-ended project, and I expect and hope this line of work to continue and intensify.

As for a more theoretical dimension, the future of a line of research is hard to predict: we do not know what new ideas will emerge, which may suddenly change the perspective. Nevertheless, some strands that bear promise and which will probably be developed can be identified.

I mentioned the fact that the empirical discoveries of cartographic work can function as generators of well-defined, structured empirical questions for syntactic theory. This can enrich the empirical basis of theoretical work, and suggest new lines of investigation. Why do so many stable properties hold of functional sequences across languages? Clearly, principled explanations are called for. In some cases, such explanations will require a theoretical focus on the interface properties between syntax and interpretation. Just to give an example, consider the fact that *wh*-elements corresponding to *why* manifest special positional properties, language after language, with respect to other *wh*-elements (including other adjuncts such as *where*, *when* and *how*: Rizzi 2001). It's not very plausible that *why*-type elements would choose a special syntactic position, language after language, as a primitive and arbitrary syntactic property: it is more likely that the special syntactic properties of *why* will be linked to the special interpretive properties of this kind of element, which have been addressed by semanticists and analytic philosophers (see, e.g., Bromberger, 1992, and Bocci et al., in preparation, for possible lines of attack to the problem). So, refining interface studies should be the key to arrive at a deeper explanation of the observed syntactic properties, in this and many other cases.

In other cases, formal ingredients of syntactic computations may be relevant to explain properties of the functional sequence: locality (e.g., as in Haegeman 2012 on many cartographic properties

of adverbial clauses), the criterial approach (as in Samo's 2019 cartographic analysis of V2 phenomena), or the labeling algorithm (as in Rizzi 2016 for freezing effects linked to criterial positions). Typically, appealing to such formal ingredients to explain cartographic properties cannot involve the mere application of standard formulations of the principles, but requires significant adjustments, and sometimes important modifications, thus improving the theoretical apparatus. I hope this trend will be further developed in the future.

One important recent development of cartographic studies is that different groups have started exploring connections between cartographic research and other domains using different methodologies and open to applied dimensions. For instance, a section was devoted to didactic applications at the 3d International Workshop on Syntactic Cartography (BLCU, Beijing, October 2019). Among other presentations, Prof. Aquiles Tescari Neto (UNICAMP) reported on methods for second language learners based on Cinque's (1999) results on adverbial orders in the clausal hierarchy, and on the ordering between adverbial and verbal forms.

As for the links between cartographic studies and computational linguistics, it is important to mention Cristiano Chesi's approach combining cartographic results and top-down computational modelling, developed in his doctoral dissertation (Chesi 2005) and in much subsequent work. Recently, Giuseppe Samo (BLCU, Beijing) and Paola Merlo have started a collaboration on the use of quantitative computational methods to address questions of cartography and locality (see, e.g., Samo and Merlo 2019).

In the study of first language acquisition, Friedmann, Belletti & Rizzi (2020) have proposed the "Growing Trees" approach, using results on the cartography of the left periphery to address the order of L1 acquisition concerning left peripheral constructions in Hebrew. Analogous methods can be considered for bilingual acquisition, as well as for the study of language-related developmental pathologies, and of language loss in acquired pathologies.

The capacity to promote interdisciplinary work involving questions of fundamental research as well as practical applications is another important sign of what I called the "heuristic capacity" of a research line



at the outset of this interview. I very much hope that the very different strands I have mentioned, and many other aspects of research connected to cartographic studies, will be actively pursued and developed in the future.

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Recebido em: 26/04/2020

Aprovado em: 29/05/2020