

## Between relativism and universalism

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Pieter A.M. Seuren, *From Whorf to Montague. Explorations in the Theory of Language*. Oxford University Press, Oxford. 365 pp.

### 1 Introduction<sup>o</sup>

The title of the book under review is multiply ambiguous. It may suggest: (i) a historical account of a twentieth-century development in theoretical linguistics beginning with Whorf and ending with Montague; (ii) a programmatic course through history on how modern theoretical linguistics took its first important step with digesting Whorf's insights and how Whorfian semantics transformed step by step – each step on a higher level – into the current optimum: Montague semantics; (iii) explorations concerning the wide 180° scale between the opposites Whorf and Montague who nowadays represent diametrically opposed visions on how to develop a theory about natural language.

Although there is a lot of historical information in it, in particular in the well-documented, convincing and interesting chapter about the Whorf Hypothesis and in chapter 6 about the Chomsky hierarchy in retrospect, the book takes history only into account in complementing the discussion of more systematic issues. And although Montague takes a quite higher position on the appreciation ladder than Whorf – whose famous hypothesis ends up on the rubbish heap of history – Seuren quite firmly rejects Montague grammar as a serious model for linguistic theorizing because of its not being able to deal with cognition. So the title of the book is best seen

<sup>o</sup> I would like to thank the anonymous referee and one of the editors of *Nederlandse Taalkunde* for helpful remarks on the final section about formal semantics and cognition.

as offering a broad range of topics in the domain between the two poles: an engineer (Whorf) on the left-hand side, a mathematical logician (Montague) on the right-hand side and Seuren halfway between the centre and Montague, though not necessarily feeling himself on the same track.

Seuren's position in theoretical linguistics is not unproblematic: he once belonged to a school – Generative Semantics – with scholars like McCawley, Gruber, Postal, Lakoff, Ross, among others who were interested in semantics in the late sixties. However, they happened to lose the fierce battle – some call it a war – against Chomsky who always managed to harbour his most recent pupils into the main stream, first that of Autonomous Syntax in the seventies, of Government and Binding in the eighties and of Minimalism since the nineties. The falling apart of Generative Semantics and Seuren's persistent faithfulness to some of its basic assumptions have led to a remarkably independent own niche in the force **or** arms **of** between easily recognizable or self-declared schools such as minimalism, Montague grammar, categorial grammar, functional grammar, cognitive linguistics, etc. etc.

This makes the book under review unique in the sense that its audience is to be found in circles mostly diagonally opposed to Seuren's own perspective on how to do linguistics. Seuren has a profound knowledge of his adversaries and his learned book is clearly written as an invitation to those with whom he disagrees to discuss the problems brought up by him. His style of writing is very lucid, clear and thorough. Hopefully for him those addressed by him in the book under review will react to his challenging invitation to carry the debates about the issues discussed further. His often very personal comments on adversaries and his sharp pen, however, do not guarantee that the herd reflexes of those who feel more comfortable in a "school" are put in the pocket. To call Chomsky a behaviourist and a neopositivist (p.160) and his point of view on meaning perverse (p. 206) is not especially a diplomatic way of inviting Chomsky-adherents for a discussion. On the other hand, the sharpness of the pen can be understood as an indignant reaction to feeling (unjustifiedly) ignored on the basis of main stream homey smell rather than on the basis of content.

It is too easy to consider Seuren's idea about *Semantic Syntax* (a relabelling of Generative Semantics) superseded and this is exactly the way he has been dealt with in Chomskyan (minimalistic) circles: by ignoring him. In the nearly fifty years between his generative semantic Seuren (1969) and the book under review, however, Seuren has extended the original general semantic conception on grammar considerably in numerous publications, both theoretical and descriptive. A lot of this work is made part of the book

under review and so I will try and order its main lines of thought in terms of those extensions. This seems to me the only way to do full justice to it in spite of the fact that as a Montagovian semanticist I follow at least one different line. That does not change the appreciation I have for it, both for the contentual richness and the insight into problems for current linguistic theory, problems raised in a challenging way.

The basic idea of Generative Semantics was to assume a derivational connection between a logically organized universal Deep Structure and the resulting Surface Structure in a specific natural language. The nature of this connection is in Seuren's view (still) a transformational one. Seuren no longer adheres to the model in Figure 1, which he used in his Seuren (1969). The most important extension is to be found at the "left-hand side" of this model, as shown in Figure 2: linguistic theorizing does not begin with logic, rather with cognition, more specifically with a cognitive perspective on the role of logic in structuring our cognition.



Figure 1 Two levels of representation

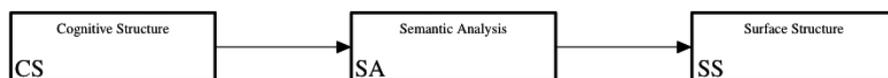


Figure 2 Three levels of representation

The model in Figure 2 opens for Seuren the way to reconsider the role of Deep Structure in the model of Figure 1 some of its features being taken over by CS. Thus his Semantic Syntax mediates between thought (intent) in the domain CS and (specific) language in the domain SS. The transition from Figure 1 to 2 should not come as a surprise given the rise of Cognitive Science in the past decennia in psychology and psycholinguistics. After all, the author is connected as a researcher with the Nijmegen Max Planck Institute for Psycholinguistics, so he is thoroughly acquainted with all sorts of work on the relationship between cognition and language competence. The model in Figure 2 is clearly compatible with the psycholinguistic perspective of Levelt (1989) in so far as its subtitle *From Intention to Articulation* covers the left-hand side and the SS-box at the right hand side.

Apart from giving room to all sorts of developments in cognitive science since 1989, the extension offers the possibility for the linguist Seuren to unload the overburdened Deep Structure of his earlier model in Figure 1 by

assuming that our cognition takes over duties that were located in grammar some decennia ago (the reverse is also true as will become clear below). Due to the interdisciplinary setting just mentioned the author knows that the extension with CS is not unproblematic for the model in Figure 1 in the lack of a well-established theory about human cognition. This is visible in the book under review: there is an extensive comment on work of another Max Planck colleague, Stephen Levinson, which shows disagreement about nearly everything on which one can possibly disagree.

The exploration of the consequences of an extension in Figure 2 makes the book interesting because it should be evident nowadays that one cannot have a linguistic theory about grammar without taking into account the fact that our linguistic competence is just a part of a larger capacity: the cognitive structuring of our experience with the world out there. “The mind is primary and reigns supreme” as Seuren observes (p. 83). In fact, as we shall see, the prominent role of grammar in expressing thoughts is reduced by him to an ancilla-role witness the slogan of the chapter about the Whorf hypothesis: *lingua ancilla mentis* (‘Language is the mind’s maid-servant’).

Continuing the use of the classical frame of reference, one should also observe that the model in Figure 2 puts Seuren in the role of Pandora: all evils in the world of linguistics and psycholinguistics seem to creep up given this model: whorfianism (left arrow reversed), relativism (no intermediate SA), behaviorism (no boxes at all), logical neo-positivism (no CS), minimalism (no semantics in SA), etc. Imperturbably, Seuren wages a fight against each of these *-isms* in order to get them back in the jar. This makes the book interesting because he takes ample time for each of the confrontations while offering his own views in steering between non-formalization and formalization.

## 2 Whorfianism and relativism

One major fight is against Whorf, the icon of relativism. Two long chapters are dedicated to rejecting Whorf as a guide for linguistic theory: chapter 2 *The Whorf hypothesis* (29-84) and chapter 3 *Relativism or a universal theory?* (85-146). Seuren makes a clear distinction between Whorfianism and relativism by pointing out that the former concerns the direction of the arrow in Figure 2, whereas scholars committing themselves to the latter are inclined to accept the CS-box ignoring the independent status of the SA-box by reducing the importance of linguistic rules as part of a system. One of

the key convictions in the book is the assumption that the level of SA essentially involves language universals. This is due to the fact that Seuren makes use of the language of modern predicate calculus as the carrier of expressions in SA. Underlying this use is the conviction that set theory is decisive for categorization and that categorization is a matter of cognitive organization rather than a matter of linguistic labeling. According to Seuren, in categorization there is little in language that is not also found in general cognition: language is a mere derivate of it.

Seuren's prepares his attack on Whorf and on relativism by fostering the view on a language that it is principally part of a social reality. He firmly rejects Chomsky's strategy to ignore the social parameter in obtaining linguistic competence and therefore he automatically seems to land in the linguistic camp where functionalists, cognitive linguists, and relativists feel well. Chapter 1 *The settling of a language* (7-28) is a crafty move in preparing the attack on the Whorf Hypothesis by going some way to meet Whorfians in dealing with what he calls *linguistic settling*. This notion presumes norms concerning the use of language in a community: people tend to follow the standard of the group they are part of. Because individuals happen to operate in different social groups they are aware of different standards and so they are able to use a large number of (dialectal, sociolectal) variants.

By assuming that an important part of linguistic competence concerns internal variability, Seuren is able to formulate the question of which limits there are to arbitrariness and variability from an interesting perspective: to what extent is a language community free to express itself? Are speakers subject to universal restrictions or not? He makes a distinction between central and peripheral thought processes, underlining that thinking needs peripherality. In this way, Seuren reduces the many differences between the language of individuals and communities that appeal so much to Whorfians, to routine formation and unconscious automatism below the threshold of possible awareness. This gives Seuren the opportunity to attack Whorf on diminishing the role of autonomous thought at the cost of emphasis on how languages differ. Seuren is at his best here in showing that structures initially semantically transparent can be fixed in the course of time and that Whorfians are misled by thinking that these structures still determine our thinking.

Interestingly enough, Seuren draws the conclusion that by focussing on differences Whorf's thesis ends up in the context of neopositivist and behaviourist thinking, although Whorf escapes from being considered a behaviourist. Seuren even holds that Whorf may be seen as someone inter-

ested in concept formation. In that sense, he could be considered a forerunner of those who are interested in the satisfaction conditions of concepts (I understand this as saying that concepts are shaped in terms of characteristic functions which map to 1 or 0). Seuren argues that Whorf unjustifiedly took the wrong direction by reversing the arrow between CS and SA in Figure 2 without any need to do so. This holds both for the strong version of the Whorf hypothesis which says that nature is dissected along lines laid down by our native languages and that ontological categories and types are organized by (the linguistic systems in) our mind, and for the weak version which says the same as the strong version but with the escape hatch: ... largely organized ...). This means for Seuren that the engineer Whorf ended up with a different mathematical logic for each language. He disagrees strongly with both versions in arguing that Whorf enthroned language at the cost of cognition and argues that linguistic expressions are embedded in larger cognitively organized information structures. This means that language underdetermines interpretation: “the real work happens in the mind and [...] language is merely the mind’s handmaiden”.

Whorf’s hypothesis lost its significance in theoretical linguistics by the dominance of the Chomskyan perspective on language in the sixties and seventies, but it regained its original attraction in the wake of the loss of confidence in set theory as the foundation for categorization, as phrased by e.g. Rosch (1973; 1999) and Rosch and Mervis (1975). This *prototypical* view opened the way back for Whorf, now into psycholinguistic work, which massively turned away from Chomsky’s persistence on autonomous syntax. Seuren points out that Whorf also never disappeared from the scene in anthropological linguistics. Historically, he places the Whorfian enterprise in a historical development to which also the romantic tradition of *Sturm und Drang* belongs. The historical sketch of the roots of the Whorfian philosophy of mind is quite interesting.

The chapter also contains an extensive review of psycholinguistic research in which the Whorf hypothesis was experimentally tested with respect to colour (Brown and Lenneberg (1954), Berlin and Kay (1969)), orientation and language acquisition involving space and time (Levinson 2003, Bowerman and Choi 2003), left- and right-handedness (Casasanto 2009) – left-handers mostly consider left as good, whereas right-handers identify right with good –, and finally differences in expressing duration in English and Greek (Casasanto 2008).

Seuren sees no reason for changing his negative attitude with regard to Whorfian hypothesis in the light of these experiments. In the case of col-

our, he finds them inconclusive; with regard to the experiments on space orientation, he concludes that spatial patterning is a matter of CS and does not depend on language; and with regard to handedness he observes that the fact that *right* in English is associated with 'good' and *left* with 'weak' can be explained as simply due to the fact that 90% of the people are right-handed. Seuren's reaction to the Whorfian idea that our experience of time may influence our cognitive representation consists of an extensive review of Casasanto's work. As pointed out in Casasanto (2008:69) one should not exclude that speakers of a natural language are influenced by the metaphors they use: the future is ahead of us (English), behind us (Aymara), below us (Mandarin Chinese). His paper describes an experiment concerning the different ways in which English and Greek speakers use a metaphor for the conceptual mapping between space and time (English, linear, one-dimensional), Greek (volume, three-dimensional). Casasanto defends the position that conceptually seen English and Greek speakers do the same in correlating their physical experiences, but he does not exclude that the two languages help to shape thought each in its own way dependent on the metaphors available. Seuren uses the settling notion of his first chapter in order to minimize the dependence of mental representations on this sort of linguistic means. He considers the outcome of Casasanto's experiment as belonging to the peripheral and not the central thought. Summarizing, Seuren is not convinced by the experiments amply discussed in this chapter.

Chapter 3 *Relativism or a universal theory?* draws a bead on relativism, the point of view that languages differ so much that it is hard or impossible to find one structural property they share. In order to let his SA apply in the model of Figure 2, Seuren targets relativism on its holding that cultural values such as language, norms, truths, etc. have been developed relative to those who share these values without any specific limits that can be seen as being imposed by the natural endowments of the human species. Relativism is also closely connected with the idea that there is no absolute standard for truth and falsity, so that truth can be taken as consisting in what people take to be true. This idea seems really endemic to anthropological circles holding that cultures vary indiscriminately without universal constraints. Those who have problems with political correctness – a direct consequence of relativism – as a precept for cultural and social behaviour, will appreciate Seuren's putting aside of relativism as an inadequate way of thinking.

Seuren reproaches relativists with sheer laziness by not being interested in maximizing explanation. Historically he explains this by observing that

anthropological research, one century ago, could take the unity of mankind for granted so that the diversity of its various physical, social, cultural and linguistic manifestations became the focus of interest. In a broader philosophical perspective, Seuren takes relativism as going back to Locke's idea that sensory input determines cognitive content. That line of thought reduces all knowledge to sensory input and all reality to matter and allows for a drastic cutting on universal properties of the human species. Locke's idea appealed to other philosophers speaking out on the nature of language – Seuren positions Giambattista Vico, Etienne Condillac, and Wilhelm von Humboldt on that line, as well as Bertrand Russell – but more recently it is directly connected with neopositivism, which he considers an excessively data-oriented philosophy of science.

Universalism is for Seuren the conviction that there is a universal set of principles determining how languages develop and function. Intrinsic principles follow from the physical constitution of the world, the physiological and anatomical make-up of the human body, the species-specific nature of the human mind and the way in which humans communicate with each other. Extrinsic principles manifest themselves in the form of one or more modular learning and/or processing programmes prewired or hard-wired into a specifically linguistic part of human genetic structure and predisposing language learners to the natural acquisition of languages. More technically, his SA expresses scope relations and variable binding, predicate-argument structure and the universal meanings of logical operators. Non-logical lexical items/predicates vary. "What is universal about the logical language of SAs is not the lexical predicates selected by the lexicon of each language but the fact that whatever predicate is selected it must fit into the scope-determining structural format of that logical language." (p. 305)

Seuren does not like the idea of diminishing the role of truth to correspondence in judgments of taste. His universalism recognizes the great variety that can be observed in theorizing about linguistic phenomena, but observing diversity always presupposes the need for unifying general testable hypotheses looking for a maximally unified general theory of language. So, in essence, his universalism represents a constructive methodological attitude, where the burden of the proof is with the universalists. They aim at results of scientific analysis and description by which diversity is to be explained by reduction. This should sound reasonable for linguists: it secures their participation in cognitive science by proposing universal features of human language that should be accounted for on top of theories of physical conditions of sound transmission, physiological properties

of sound perception, and cognitive processing patterns outside the domain of language.

At this point, the implicational universals of Greenberg (1963) appear in sight enhancing Seuren's position. They give him the opportunity to argue that it is too early to fix oneself on either relativism or universalism, because Greenberg's forty universals are in fact empirical generalizations leading to a small number of general principles (1963:75) and we are still at the beginning of making these generalizations. In that sense, Seuren comes close to the Greenberg *et al.*'s Memorandum which says: "Language universals are by their very nature summary statements about characteristics or tendencies shared by all human speakers. As such they constitute the most general laws of a science of linguistics (as contrasted with a method and a set of specific descriptive results)"(1963:xv). It is along this line that Seuren attacks the forms of relativism that he observes in anthropological and typological circles and the absence of theory formation in the so-called cognitive linguistics.

The chapter is not only a reckoning with Whorfian and other forms of relativism, it also contains constructive attempts to add new universals to the stock of Greenberg universals, such as the fact that in all languages there are complex propositions, that the grammar of a language always belongs to a certain formal type in the so-called Chomsky hierarchy, that the Relative Accessibility Hierarchy as proposed in Keenan and Comrie (1977) and Comrie and Keenan (1979) is well established by empirical data, that semantic constituency is continuous in spite of being carried by discontinuous elements, that constituent structure is hierarchically ordered, among others. This turns the chapter on relativism into a positive contribution to linguistic theory. By the discussion of some of these universals Seuren prepares for the second half of his book, in which he leaves behind the relativists and the Whorfians in order to focus on the role of logic in linguistics. In that excursion, however, he shares the cognitive outlook with those he leaves behind: the main enemy to be challenged is called *neo-positivism*, that branch of the philosophy of science to which, according to him, behaviourism belongs. Seuren aims at replacing the neopositivist perspective on how to do logic by a cognitive one: to do linguistics is to try and find a mathematics and logic implemented in the human mind as part of the cognitive machinery. In other words: language cannot be studied without cognitive meaning and the logical system underlying natural language cannot be discovered without taking into account cognition. One of the remarkable features of Seuren's detailed ana-

lysis of the role of logic in linguistic theory is the rehabilitation of Aristotle as the primary guide to logic.

### 3 Montague grammar, Chomskyan autonomous syntax and neopositivism

In chapter 4 *What does language have to do with logic and mathematics?* (147-172), Seuren argues that natural language has an inherent natural logic, probably the same for all languages. Lexical items of a language are to be taken as predicates regardless of their surface meaning. Among them there is a set of morphemes standing proxy for logical operators whose meanings jointly define a logical system. One important (universal) property of logical operators is that they have scope. Seuren assumes there to be a regular mapping relation between logical structure structurally expressing scope relations and surface structure. On this view, the grammar of a language is in principle a mapping relation between lexically filled logical structures in SA and linguistic surface structures in SS.

By assuming that sentence structure is based on the subject-predicate structure of propositions, Seuren explicitly appeals to a tradition in which Aristotle, the Stoa philosophers and the Alexandrian linguists find their place. At the moment, however, that one expects Seuren to say positive things about the modern formal logical semantics that provided the means to deal with subject-predicate structure, he makes a sortie burning down Montague's model-theoretic approach to natural language by accusing it of neo-positivist hubris. In my view, if one thing should be clear about the work collected in Montague (1974) is that it provides the means to reconcile Russell's formal, clearly anti-Aristotelian, first order predicate logic with Aristotle's subject-predicate division. Montague did that by integrating the  $\lambda$ -operator in his higher order logical system. Apart from taking a lambda-expression as a mathematical function essential to computing complex structures, he uses lambda-abstraction to "freeze" the underlined predicate of (i) *John wrote a letter to Mary*, so that (i) can be understood in the Aristotelian way as being a part of a subject-predicate construction, whereas it also makes it possible to treat the sentence as simultaneously expressing a Russellian three-place relation between John, a letter and Mary. It is somewhat misleading to say that Montague proposed to translate English into standard first order language in which the resulting logical expressions are tested for truth in possible worlds. This first attack on

Montague grammar is on the ground that Montague accepts Russell's predicate logic. More thrusts will follow, as we will see below.

According to Seuren, Aristotle and the Stoics provided all the logical operators needed for natural predicate logic (*all, some, not, possible, necessary*) and propositional logic (*and, or, not and if*). Here we get to an essential ingredient of Seuren's plea for natural logic. As known, many modern formal logic systems reject the Square of Oppositions in which the Aristotelian logical operators are related in terms of being contradictory (e.g. *All R are M* vs *Some R is not M*), contrary (e.g. *All R are M* vs *No R is M*), subcontrary (e.g. *Some R is M* vs *Some R is not M*) and subaltern (*Some R is M* vs *All R are M*), where R stands for the restrictor predicate of the subject and M for the predicate in the Matrix clause. This is due to the fact that some these relations do not hold any longer if the extension of R is the empty set  $\emptyset$ . This is because the *some*-operator  $\exists$  is to be defined as having a requirement on R that its denotation is not the empty set.

In the traditional Square of Oppositions it should follow that *All children are happy* entails *Some children are happy*, but this subaltern entailment is impossible in the case of  $\llbracket \text{child} \rrbracket = \emptyset$ . In that case, Seuren says, *All children are happy* can neither be true nor false on the basis of the principle of strict bivalence. The subaltern entailment relation between sentences with *All* and *Some* can only hold if there is a restriction on the use of the universal quantifier amounting to the requirement that the denotation of R in *All R are M* exclude  $\emptyset$ . Here we recognize the Russell-Strawson debate on referring and Seuren is clearly on the Strawsonian side. Seuren's reproach to modern logic is that it turned away from linguistic theory by accepting that meaning can be assigned to *All children are happy* in situations where there are no children in the domain of interpretation. In other words, as long as modern logics defines the universal quantifier  $\forall$  in terms of  $X \subseteq Y$  it comes off worst when compared with the Aristotelian logic which uses  $X \subseteq Y$  &  $X \neq \emptyset$ . This is a very interesting position and it deserves to be taken into consideration by accepting it or rejecting it, but not by ignoring it.

Chapter 5 *A test bed for grammatical theories* (173-204) has a double function. The message of the preceding chapter was: make logic more human by having an eye for how native speakers interpret sentences in their language without being bothered by model-theoretic issues like soundness and completeness. The signal of the fifth chapter to logicians is that the grammar and the semantics of natural languages incorporate formally very complex systems that can only be unearthed by meticulous and systematic empirical observation and this is not what logicians do, but

should do. Their tinted glasses see far too less the richness in the range of colours making up the wealth of data that should be captured by a theory. There is a second signal, for those already addressed in the chapters 2 and 3 on Whorf and relativism. The chapter functions as a way to argue for the minimum of what should be done in linguistics itself. According to Seuren, there are crucial observations forming a test bed whose purpose is to eliminate certain theories simply on the ground of their not being able to account for them.

Seuren distinguishes between two sorts of fact: A-facts and B-facts. The former typically do not result from learning a language and they are outside the domain of the settling phenomena discussed in chapter 1. They suggest a universal, species-specific innate set of grammatical and semantic principles restricting choices that can be made by natural language grammars. A nice example of an A-fact – not discussed by Seuren – could be the fact that English speakers, without ever having been confronted with similar sentences immediately interpret a sentence like (ii) *#For hours, John broke his arm* as pertaining to something impossible or odd because it forces one into believing that John was involved in a process of repeatedly breaking his arm in the period denoted by the *for*-adverbial. This should be an A-fact because this reaction to (ii) must have something to do with processes of discretizing the external world in our cognitive organization.

Seuren puts three issues on his A-list: (a) *the epithet pronoun test*, (b) *topic-comment structure*, (c) *scope and negation*. I will briefly discuss one of them in order to give an idea about how Seuren handles them. The test under (a) concerns the distinction between referential and bound anaphora. With respect to sentences like (iii) *When the professor ascended the lectern, nobody paid attention to the fool* the generalization aimed at is that only referential pronouns allow for replacement by an NP, in this case *the fool*, whereas bound anaphora do not allow this; cf. *In the fool's room, John hit the professor on the nose vs \*In the fool's room, the professor smokes cigars*. In his discussion of the difference between referential and bound pronouns, Seuren again goes on at the shortcomings of Russellian and Montagovian logic but also at Kamp's Discourse Representation Theory for dealing wrongly with this difference, which is known as the donkey anaphora problem. For Seuren the solution is to assume that the referential "address" (= the representation of a new individual in the domain of discourse) does not have a truth value (i.e., as I understand it, is immune to the characteristic function mapping it to 1 or 0), but is a mental representation in CS having no referential status because it does not (yet) denote

something in the domain of discourse. Referential pronouns provide a referential value to an address, bound variables do not.<sup>1</sup>

B-facts represent language-specific acquisition results. Under this label, Seuren discusses (a) German and Dutch verb clustering and (b) The inflected infinitive in Portuguese. The former topic enables him to reject the view of cognitivist or usage-based approaches that language acquisition is a matter of statistical learning, because he shows that the choices made by German, Dutch and English in the domain of verb clustering and auxiliatation can be described by rules of grammar. Something similar holds for European and Brazilian Portuguese. For Seuren it is too early to approach diversity in terms of statistics at the cost of ignoring rules. I am inclined to support him at this point because the darwinian struggle for survival between words and phrases in language (think of the struggle – or if one prefers: the division of labour – between the Imparfait, the Passé Composé and the Passé Simple in French, and the niches in which losing linguistic forms may survive) can often be understood as a matter of structure rather than of arbitrariness (cf. Caudal and Vettters 2007).

Before dealing again with Montague, Seuren discusses in chapter 6 *The Chomsky hierarchy in perspective* (205-238). This perspective enables Seuren to say that Chomsky's classification of algorithmic systems for producing languages was certainly valuable at the time (i.e. in the early sixties). Chomsky distinguished between four types of grammar: type-3 Finite State grammars (Markov Systems), type-2 Context-Free grammars, type-1 Context-Sensitive grammars and type-0 Transformational grammars. Seuren discusses them all in detail, which makes the chapter valuable for those who want to refresh their memory. From the present point of view, Seuren finds the Chomsky hierarchy repulsive because it is based on the idea ("the ideological altar" (p.233)) of Autonomous Syntax which holds that sentences are algorithmically produced from an initial symbol without any regard for what sentences mean. This way of thinking is somewhere be-

<sup>1</sup> When I consulted my copy of Landman (1986) in order to see why I could not escape from the thought that Landman's so-called pegs share certain characteristics with Seuren's *addresses* – which is indeed the case, although they have a somewhat different status – I could not evade looking at the pencilled lines which I once put in the margin. One of them marks Landman's statement "Logical forms, I take to be the mental representations in which our thinking takes place, they form, so to say, the *syntax of thinking*". There are similar remarks in the chapter *Data Semantics: an epistemic theory of partial objects* such as 'Propositions are not logical forms, they are their interpretations, and as such they are intersubjective'. This puts Landman (1986) on the list of works in the tradition of formal (Montagovian) semantics which really think about logical forms as mental representations. I will come back to this point later on.

tween absurd and perverse, Seuren says, because it means that knowledge of what an algorithmically produced sentence means cannot be seen as belonging to a speaker's competence. In his rejection of semantics, Chomsky displays "a hangover from behaviourism, a brand of psychology Chomsky has been unable to detach himself from completely, despite his severe criticism of it" (p.209). Seuren's aversion to Chomsky's formal work on generativity in Chomsky (1963) does not prevent a systematic analysis of the Chomsky hierarchy in order for him to reach the position that the relation between SA and SS is transformational. In the final section of the chapter (233-238), he also gives consideration to the formal status of grammars in the evolution of language and concludes "that the Chomsky hierarchy is irrelevant to the study of language evolution ... For Autonomous Syntax is incompatible with a realist interpretation of the theory and compatible only with an instrumental interpretation. But what the evolutionary studies of human languages are after is precisely a realist, and not at all an instrumentalist, theory" (p. 236).

#### 4 Reconquering lost terrain for semantics

Chapter 7 *Reflexivity and identity in language and cognition* (239-256) defines two goals: (a) the replacement of (underformalized) Gricean Maxims by a more precise (formal semantic) treatment of data; (b) the rejection of possible world semantics because of its overformalization. The two goals are brought together on the ground of the consideration that a theory of natural logic concerns part of the human innate endowment.

Natural logic surpasses the explanatory power of the Gricean maxims which have unjustifiedly been taken as belonging to the domain of pragmatics rather than to the domain where they belong: semantics. The leading idea is that Grice could only postulate his maxims because at the time he proposed them in Grice (1975), there was a huge gap between formal logic and natural logic. Seuren claims that his natural logic as it expresses itself in his SA makes the Gricean maxims otiose. This is quite a stunning claim, given the omnipresence of Grice in all sorts of semantic research where people on the fuzzy borderline between semantics and pragmatics feel more comfortable in appealing to pragmatic principles rather than to semantic generalizations. Seuren's claim is interesting because he wants to regain lost ground. He does this on the basis of the so-called True Binariness Principle (TBP) which says that binary predicates are always truly binary in

that they require distinct mental entity representations (addresses) for each of the individuals for which the binary relation holds.

His claim is worked out in some detail in the domain of reflexivity. For all binary predicates  $P$ ,  $aPb$  is uninterpretable when  $a$  and  $b$  are codenotational. In that case, a new unary predicate  $P^{\text{ref}}$  is created, meaning ‘self- $P$ ’. When  $a$  and  $b$  are no longer codenotational, they are disidentified in a cognitive construction and so there are two cognitively distinct elements (addresses) precluding reflexivity. The TBP solves paradoxes as in *All girls envy the girl Trisha*, where the denotation of *all* cannot include Trisha. Applying the TBP to a number of different issues in which reflexives play a role, Seuren argues that in all these cases the semantic approach in which the TBP finds its place is superior to the Gricean pragmatic approach. Again Stephen Levinson is the culprit of Seuren’s attack on relativism, more in particular on the idea that Gricean maxims take over things that are to be done by semantic theory.

Seuren’s reproach to Montagovian semantics is that it fails to take into account speech acts, presuppositions, topic-comment structure, the expression of thoughts from CS to SA and the transformational processes from SA to SS. The basic idea for him is that the transition from CS to SA hinges on the notion of intent, which for Seuren consists of a speech actor operator and a proposition. A proposition is for him the primary bearer of a truth value but in linguistic interaction, a proposition is always commanded by a “socially binding operator” committing those involved to it. Thus a sentence never expresses a mere proposition but it always contains a speech operator specifying the speaker’s socially binding commitment with regard to the proposition expressed.

The introduction of the speech act operator is based on notions emerging from psycholinguistic work on thinking-for-speaking (Slobin 1987) and microplanning (Levelt 1989). Languages differ in the requirements they impose on how intents crystallize into forms of SA. These differences concern choices made with respect to evidentiality, tense, aspect, modality etc. But each language has a sort of “semantic questionnaire” that must be filled in before the message can be processed into a proposition. Semantic theory is thus much more cognitively oriented and it covers a much wider range of topics than possible world semantics. In this way, Seuren sees himself as steering between non-formalization (pragmatics) and formalization (possible world semantics). Addressing himself to the formalists, he states: “Linguistic meaning is primarily the system-driven property of a sentence  $S$  as a linguistic type-level unit, in virtue of which a linguistically competent hearer is able to reconstruct speaker’s intent (that is a speech

act operator over a proposition) from any utterance token of S, given proper values for contextual and situational parameters” (240/241). The conclusion of this chapter is that the discrepancies between standard logic and natural language seem to lose any significance when cognitive principles are allowed to interact with logical systems.

Chapter 8 *The generalized logic hierarchy and its cognitive implications* (257-300) is a long chapter in which Seuren embarks on a meticulous presentation of his basic-natural predicate logic in which the absence of the null set  $\emptyset$  is crucial. There are two basic sentence types: A (All R is/are M) and I (Some possibly all R is/are M). Together with external negation  $\neg A$  (Not all R is M) and internal predicate negation  $I^*$  (Some R is/are not M), this yields eight sentence types. Going along, more sentence types are added such as N (No R is M), Y (Some but not all R is M) and U (All or no R is M). In defining the Aristotelian (contradictory, contrary, subcontrary) relations between these types, the Square of Oppositions is extended into hexagonal, octagonal and even dodecagonal structures. This makes the chapter different from the others because readers have to check the many calculations before being able to evaluate the main thesis. Those who are acquainted with generalized quantification will have no problem in doing so. It means a lot of homework, but it is worth the effort even though one may be led to a different conclusion than foreseen.<sup>2</sup>

An interesting feature is that Seuren inspects all sixteen possible relations between the extensions of the predicates R and M, such as  $\llbracket R \rrbracket \subset \llbracket M \rrbracket$ ,  $\llbracket R \rrbracket \cap \llbracket M \rrbracket = \emptyset$ ,  $\llbracket R \rrbracket \supset \llbracket M \rrbracket$ , where  $\llbracket R \rrbracket = \text{Ent}$  (i.e. the set of all entities in D) may or may not be the case, etc. Observing that modern logic has incorporated the empty set as a possible predicate extension in order to restore a violation in the laws of logic, Seuren argues that human cognition does not count the empty set as a factor in the relations between sets and that there are several ways of dealing with this infraction, among which a theory of presuppositions which he claims to have available.

According to Seuren, the basic restriction on natural logic  $\llbracket R \rrbracket \neq \emptyset$  does not make logic inconsistent. It is even quite easy to maintain consistency. All that is needed is to take the conversions  $\neg \forall \equiv \exists \neg$  and  $\neg \exists \equiv \forall \neg$  as one-

replace  
yellow  
symbol by  
purple one

<sup>2</sup> Seuren’s suggestion that his form of generalized quantification differs essentially from what he found in the literature, seems to me not really convincing. His idea that “generalized quantifiers are binary higher-order predicates [...] establishing a set-theoretical relation between two sets” (page 267, fn. 6; see also fn. 4) is widely accepted in Montagovian circles. It is hard to see why he rejects Montague’s formalism as infected by neopositivism and behaviorism while accepting the formalism of generalized quantification which builds upon the framework of Montague grammar.

way entailments rather than equivalences. In this analysis, the notion of Valuation Space is crucial. Seuren defines the valuation space  $/S/$  of a sentence  $S$  as the set of possible (admissible) situations in which  $S$  is true. Each valuation is thus a description of a member of this set. At first sight one wonders whether there is such a great difference between situations and possible worlds. Seuren considers situations different from possible worlds in that they are defined for the sentences of a language  $L$ , that is: not language-independently. In a comprehensive analysis, Seuren argues that logical relations like entailment, equivalence, contrariety, subcontrariety, contradictoriness are definable in the set-theoretic terms of valuation spaces.

As said, it is impossible to browse through Chapter 8: it requires intensive reading and checking, but it is certainly worth the effort to go through it carefully in order to evaluate the consequences of a logical system based on Undue Existential Import. Logical systems reject the Square of Opposition because it fails as a logical system in the case of  $[[R]] = \emptyset$  and they call the Aristotelian assumption  $[[R]] \neq \emptyset$  which makes the square consistent and coherent, inadequate. By working out a logical system based on  $[[R]] \neq \emptyset$ , Seuren presents a clear alternative to those who do not distinguish between the logic of formal languages and the logic inherent to natural languages. It is to be hoped that this chapter will be seen as providing the gauntlet that is worth to be taken up.

The final chapter 9 *The intensionalization of extensions* (301-329) raised for me the question of why it is necessary at this point to revive and confirm known arguments against possible world semantics as a valid paradigm (preceding chapters did that already) and why is it necessary to sketch an alternative theory allowing for cognitive-realist interpretation (chapter 8 did already the job). The only answer I can think of is that this chapter is a sort of complement to the other chapters in the form of a philosophical afterthought both in the domain of epistemology and in the domain of the philosophy of science.

As to the former, Seuren's negative feelings towards possible world semantics are stirred by his opinion that the (Frege-) Russell-Montague-tradition is infected by a neopositivist virus. Where it goes wrong, I think, is Seuren's near-identification of logical positivism and behaviourism. I support him wholeheartedly on his crusade against the latter, but there are many reasons for making a strict distinction between the two, also because the scope of behaviourism is restricted to psychology, whereas logical positivism is to be located in the much broader domain of the philosophy and the history of science. There is no reason for tarring the Fregean anti-

psychologism and logical positivism with the same brush as behaviorism, as pointed out convincingly by Smith (1986).

Logical positivism is nowadays generally seen as having been superseded, at least in the domain of semantics. In the philosophy of science, this is due to the fact that verification has been replaced, first by confirmation later by falsifiability, as the proper way to go.<sup>3</sup> As a consequence, intersubjectivity has taken the place of absoluteness as “next best” in dealing with truth, even in natural science: scientific theories are nowadays generally seen as being based on agreement always remaining open to rejection or improvement. Intersubjectivity is an important way to escape from absolutism and to allow for individual perspective. There are sufficient reasons for seeing the logical positivists of the thirties in Europe as an emancipatory movement in the philosophy of science trying to get rid of the scholastic tradition in which Aristotle’s “natural philosophy” was instrumental as part of religious, or should I say, ideological efforts to keep an ontological eye on the outcomes of scientific research.<sup>4</sup> Their absolutism can certainly be explained in terms of the force attributed to their adversary. Thus logical positivism is to be considered an interesting but completed chapter in the history of science, so it is sort of amazing to see it treated by Seuren as still kicking and alive.

As to the ontological issue, the chapter is focussed on underlining the importance of seeing that ontology should reflect the way in which humans naturally construe the world. The mind first ‘processes’ the external world in terms of categories, viewpoints, evaluations and other parameters and language then links up linguistic forms with ‘mental forms’. Seuren takes a Kantian perspective in which extensions in a domain of discourse count in so far as they are mentally represented and projected onto what is construed as the actual or a virtual world. According to him, construal takes place on the basis of a species-specific system of forming categories and relations resulting in a verifiable and falsifiable picture of the world. The human mind constructs all kinds of virtual reality in the form of what could or might or cannot be actual reality. The semantics of a natural language L in SA therefore does not link the expressions of L with the

3 It cannot be denied, however, that positivist verificationism had a very positive side: only statements were allowed which were verifiable and cognitively meaningful. Carnap’s famous treatment of Heidegger’s *Das Nichts selbst nichtet* (“The nothing itself nothings”) displays these two important aspects of verificationism: logical positivists were focussed on establishing reliable criteria for truth.

4 It is not accidental that neopositivists were among the hunted in the thirties in Germany.

external world but with the mental representations in CS needed and used for dealing cognitively with the external world.

## 5 Formal semantics and cognition: a reappraisal

In this section, I allow myself to make some remarks about the question of whether and how Montagovian formal semantics may be embedded in an approach in which mental representations should reflect the way in which humans naturally construe the world. These remarks should be seen as providing a sort of antidote against the venenum in cauda of chapter 9.

The relation between formal semantics and the study of our cognitive organization as carried out in psycholinguistics is certainly not a happy one. Current formal semantics has its roots in the so-called Frege-Russell tradition in which a domain of interpretation  $D$  is generally taken as objective in the sense that its existence is located outside an individual speaker. In that tradition, truth and truth-conditions play a crucial role in the interpretation of linguistic expressions because of its focus on the foundation and reliability of scientific knowledge. This emphasis on the public side of meaning has left the constitution and architecture of individual knowledge more or less to other disciplines. Indeed, formal semantics based on the papers collected in Montague (1974) does not have a cognitive outlook *sui generis*, as underlined by Seuren in his critique on possible worlds semantics in §9.3 and confirmed by Thomason in his Introduction to Montague (1974).

One of the reasons for rejecting formal semantics in the Montagovian tradition as making sense for the study of our cognitive organization is that it translates linguistic categories such as nouns and verbs into logical types corresponding with sets or  $n$ -tuples of entities, among more complex structures based on set theory. A point in favour of this so-called definitional view is that it warrants the inferential strength of lexical knowledge.<sup>5</sup> The definitional theory has been challenged by the *prototypical* view proposed in Rosch (1973; 1999) and Rosch and Mervis (1975). The plausibility of the idea of a set as a correlate for a concept was harmed by empirical psycholinguistic research showing that people allow for graded membership of a set. A robin is seen by people as a better example of a bird than a penguin,

<sup>5</sup> Montague (1974) does not speak out on this issue. He is interested in the composition of meaning with sets as reliable tools because they are crucial for the inferential relation between linguistic expressions.

which is not really compatible with the mathematical view that members of a set are equal in their membership. Prototype theory became popular in psycholinguistics, all the more so by the explicit appeal to the philosophical authority attributed to Wittgenstein (1968)'s analysis of the word *Spiel* (game). It has remained popular in spite of critical reactions in Armstrong et al. (1983), Osherson and Smith (1981) and Rey (1999), among many others.<sup>6</sup> The setback for the definitional theory turned out to have a negative influence on the perceived relevance of formal semantics not only in psycholinguistics but also in the so-called cognitive linguistics based on Fillmore (1977; 1982; 1985) and Langacker (1987; 1999; 2000), where frame semantics has led to throwing out the truth-functional baby with the anti-Fregean/Russellian bathwater by playing down the crucial epistemological role of language in enabling language users to appeal to their knowledge and belief in seeking truth and in avoiding errors.<sup>7</sup>

So where does it go wrong in the relation between Seuren and Montague? When the copy of the book under review was sent to me in October 2013, I browsed through it and happened to open it on page 162 where my eye was struck by the remark that "Montague's programme of extensionalization of intensions shows how and why the neopositivist philosophy of science, when applied to human sciences, ultimately runs aground on the cliffs of the human mind and thus of natural language". I was happy at that moment to read this because my disagreement with that passus led to Verkuyl (2013), which I wrote for three formal semanticists (Jeroen Groenendijk, Martin Stokhof and Frank Veltman) on the occasion of their newly acquired status as emeritus. In that paper, it is argued that there are reasons to doubt whether sentences like (1) should indeed be seen as a problem of propositional attitude.

(1) John believes that all dogs are animals.

The problem of propositional attitudes for formal semantics can be solved by acknowledging the important role of metalinguistic use of language in many kinds of discourse, as exemplified in Verkuyl (2000; 2013); see also

6 It is remarkable that none of the papers mentioned above in the present paragraph appear in the Seuren's Bibliography. And the term *prototype* is not included in the Index.

7 An essential ingredient of this approach is Langacker's notion of conceptualization, which amounts to saying that "novel conceptions, sensory and emotive experience, and apprehension of the physical, linguistic, social and cultural context" (Langacker 2000:361) determine meaning. In Langacker's semantic analysis, meaning is equated with conceptualization. Seuren polishes off cognitive linguistics quite convincingly in one sentence (p.3).

Reichenbach (1947:9-17). In my view, sentences generally captured under the heading of propositional attitude can be seen differently in the light of the omnipresent metalinguistic use of sentences in many forms of discourse. If sentence (1) is true, it is not about the presence of dogs in a particular domain of interpretation D, rather it is about the meaning that John is said to assign to the word *dog*: (1) is simply an assertion about John's mental dictionary. Sentence (1) is a rather clumsy way of producing a metalinguistic statement, but sentences like *According to Mary bats are mammals, not birds* or *For John, whales aren't mammals* are more natural examples of the way we are usually speaking about beliefs attributed to other people. This metalinguistic use is widespread and in the course of the years I have collected a considerable data base collected from Dutch newspapers and other media.

The mental lexicon is generally seen as part of our memory playing a central role in the assignment of meaning because it stores our individual experiences with and beliefs about the relation between language and the world. Speakers and hearers use language not only for speaking about the world as they experience it in a specific model, in many discourse situations they (are bound to) check whether or not they share certain meaning elements in the words being used. In a discourse, disagreement about whether or not a speaker uses the right word(s) for speaking about the world often leads to a discussion about the appropriateness of words in a particular situation. Whether speaker and hearer assume the same, is dependent on how much authority is attributed by each of them to the public meaning as expressed by dictionaries, scientists, teachers, etc. and on how much they differ in their intention or capacity to make a discourse optimal for exchanging information.

In a famous Dutch novel *Woutertje Pieterse* written in the final quarter of the nineteenth century, when Darwinism was penetrating the lower levels of society, there is a famous verdict addressed by a haughty schoolmaster to a simple person and translated as (2).

(2) Miss Laps, you **A R E** a mammal.

Being part of a discourse in which she had to admit that she was neither an oyster shell nor oviparous, (2) can only be understood as expressing metalinguistically that Miss Laps cannot escape from assigning the meaning element MAMMAL to the word *woman*. The purpose of the schoolmaster addressing Miss Laps is to bring about a change in her belief system due to his access to an authoritative intersubjective knowledge base.

This is just an example taken from a novel, but in newspapers one can find a host of examples in which there is an explicit or implicit debate about the proper use of a word, where *proper* is to be seen as reflecting a maximum effort to reduce lying, stereotyping and prototyping.<sup>8</sup> But also in daily life. When I say in a game with dices *That's not a throw*, I am appealing to intersubjective knowledge (and agreement) about the meaning of the noun *throw* which, when applied to dices, requires the meaning element PROPEL THROUGH THE AIR. Real life is full of this sort of encounters which mostly concern the criteria for the proper use of words in specific domains. It immediately follows as a prominent feature of discourse that can be handled by Montagovian semantics at the moment at which it is embedded in a cognitive outlook because an essential ingredient of metalinguistic use of language is truth as a touchstone to hold on. Verkuyl (2000; 2013) argues that one can make use of Generalized Quantification Theory to account for the partial functions accounting for stereotyping and prototyping, in line with Partee (1979:3) which gives an outline of a cognitive approach based on or using Fregean and Montague semantics once the problem of propositional attitudes is overcome.

It is in fact not so difficult to cognitivize Montagovian semantics by simply acknowledging that two persons A and B in a discourse each have an interpretation function  $I$  available for dealing with expressions of a language  $L$ , for A the function  $I_A$ , for B the function  $I_B$ , completely equipped with intensions and possible worlds, or as Seuren proposes, valuation spaces, i.e. sets of admissible situations in which sentences may be true. In this picture, three elements come into play: (a) the knowledge/belief system of A, the knowledge/belief system of B and the platform of intersubjective knowledge  $K$  to which they each relate as members of the language community, by having acquired lexical knowledge, by having been at school, by having read all sorts of books, etc. etc. A and B do not know exactly from each other what they have learned (i.e. which meaning the other has attached to the words they are using), but in general they believe that they share sufficiently with respect to  $K$  to be able to talk to each other, so they do that on the assumption that  $I_A$  and  $I_B$  not only concern the same domain of interpretation  $D$  but also do the same.

This is the idealistic picture. The more realistic one is that people often

8 I was writing this in a politically dramatic summer in which newspapers are full with reports about that sort of metalinguistic statements made by Russia, Ukraine, NATO, EU-leaders, etc. considered by the other party as mere lies. *These are not separatists, they are soldiers, The NATO says to defend the Baltic states but it is mere aggression and enclosure.*

talk at cross purposes. In many situations, A and B test each other by going one step higher by leaving D for the moment as the domain about which is being talked: they talk about the words or phrases they are using. This is what I call metalinguistic breaks in an ongoing conversation about D, jumps to a higher level in order to ensure that the “regular” conversation about things going on in D can be continued. It is about sentences like *What do you mean with aggressive?*, or *In that case, you should not say that she is innocent, she knows she messed it up*, or *Rob said that Leo was egoistic, but he didn't see that Leo's leaning to isolation was aimed at self-preservation [in a Japanese camp]*, etc., etc. Metalinguistic use of language cannot be understood without an appeal to truth and sets as the crucial elements in establishing a relation between language and the world about which we speak. As noted earlier, Seuren makes use of sets as the basic tools for cognitive organization, so in that sense he is on the side of formal semantics. And he is taking the notion of truth seriously.

Seuren sees logical positivism as the primary source for the idea that truth is to be taken as absolute but holds it also responsible for the idea which he ascribes to Montague's work, namely that its formalism does not allow for a correspondence to cognitively determined reality. “All Montague intended to achieve was to describe in mathematical terms what must be the case in a model when an assertive sentence is true – an exercise that is [...] of ancillary value to a theoretical linguist, who tries to find out how language works in the brain or mind, in the world and in the society of humans” (p.314). Now, it should be remarked that in the sixties (when Montague wrote his papers on natural language) nobody was able to find out how language works in the brain. It is only due to the development of neuroscience that the past two decennia serious work on how language works in the brain is being done and theoretical linguists find themselves mostly at the receiving end of this research. It should also be remarked that Montague grammar started blooming after the so-called cognitive turn in psychology and linguistics: it provided linguists with reliable tools that enabled them to study meaning composition, inferences, quantification, discourse structure, etc. etc. Together with these tools, the philosophical logical heritage provided by the Frege-Russell tradition and including logical positivism became available as an interesting contribution on ontological issues connected with semantics.

But even long before what we now call the cognitive turn, things were never as bad as they seemed. One should begin with pointing out that Russell should not find himself in the dock of anti-cognitivism, witness the sundry remarks he makes in e.g. Russell (1914; 1918; 1940) about what

nowadays counts as a cognitive perspective on knowledge of an individual about the external world. Russell's autobiography is also quite clear about this aspect of the quest for adequate means for the regimentation of natural language. This has nothing to do with behaviourism even though Russell converted from an idealist into an empiricist.<sup>9</sup> The same applies to Rudolf Carnap, prominent member of the logical positivist Wiener Kreis, who in Carnap (1964) considers semantics a way for speakers of a natural language to obtain and structure knowledge. And Reichenbach's *Elements of Symbolic Logic* is a brilliant testimony for the attention of logical positivists for the cognitive perspective on the usage of natural language (e.g. 1947:1-22; 256ff.).

The logical positivists of the Wiener Kreis were indeed trying to develop a universally valid formal language by which absolute truth about the universe could come in sight, but this pursuit should be understood in the context of an attempt to remove ideological interference with finding out which statements are true and which are not true. The best way to look at it in the present context is to see the logical positivist search for absolute truth as taking part in a larger process of mathematization of logic and later on of linguistics rather than as an empiricist enterprise. In other words, Montague should not be attacked on his being an empiricist (if he ever were one) but on his being a too much of a mathematician working in the domain of algebra and set theory. And this would hold retrospectively for Carnap, Russell and Frege among other mathematicians who dealt with natural language. Should one blame mathematicians for being instrumental(ists) in offering tools?

This question invokes a more specific one: can one blame mathematicians for being inclined to establish eternal truths, i.e. truth from which individuals cannot escape only on the penalty of ignoring proofs? Should

<sup>9</sup> It is really necessary to take into account that Russell and his kindred souls fought a fierce battle with the Roman Catholic Church about whether or not the foundation of our knowledge of and beliefs about the external world includes the existence of God. Like many of the philosophers gathered under the label of or sympathetic to the Wiener Kreis, Russell saw Aristotelian logic as vertical, i.e. god-given. That is, why he developed a logic with n-place relations ( $n > 1$ ) which are "horizontal", bound to earth, so that God should disappear in the discussion about what counts as true statements. Russell's preoccupation with Aristotelian logic is not really surprising. After all, Galileo's rejection of the Aristotelian philosophy had not been accepted by the Roman Catholic church, so until far into the twentieth century generation after generation of bright young men were imbued with natural philosophy based on Aristotle by which the Church tried to keep science as theology's handmaiden, to use Seuren's metaphor. This emancipatory aspect of neopositivism has slipped Seuren's notice, but it explains why truth conditions were given such a predominant position.

one blame mathematicians for doing that and so should one recognize that the approach visible in formal semantics – whose aim is to warrant that formal languages are reliable due to completeness and soundness – simply follows from a natural habit. One could, of course, say that Absolute Truth in mathematical and philosophical logic is nothing but another name for God (or the Unmoved Mover, for that matter) so as to pin down mathematics as an ideology but after falsificationism entered the field of the philosophy of science, already in the thirties, one can say that for the study of formal properties of natural language mathematics is instrumental in the practical sense of the word without any claim about reality. In other words, one cannot blame Frege, Russell and Montague for not focussing on the cognitive side of natural language by following their mathematical goals. But this does not imply that the use of Montague's semantics commits to a neopositivist, behaviourist, or instrumentalist position.

In my view, Seuren's decision to wage war against Montagovian semantics is counterproductive because it positions him outside an interesting development. After all, in the past decennia a lot of formal semanticists have become aware that language is not the only factor in the cognitive organization of the human mind, without ignoring the valuable contributions made by Montague. Hans Kamp as one of his most prominent students in this domain extended the original scope of Montagovian semantics by his Discourse Representation theory in the nineties without feeling himself compelled to ostracize his teacher and many researchers in the DRT-tradition are focusing on the cognitive organization needed for discourse. In the past decennium, computational linguists have become interested in questions like 'Which computable tasks are feasible for the human mind' led by the idea that the cognitive capacities of human agents reflect computational restrictions (time, memory, etc.) as pointed out by Szymaniuk and Zajenkowski (2010:522), which justifies computational modelling of natural language by observing on page 523:

There is a tradition in the philosophy of language, going back to Frege [...], of thinking about the meaning of a sentence as *the mode of presenting* its truth-value. In modern terms we can try to explicate this idea by saying that the meaning of a sentence is an algorithm for finding its truth-value. This approach has been adopted by many theoreticians, to different degrees of explicitness, very often with a psychological motivation (see, e.g., Van Lambalgen and Hamm (2005); Suppes (1982))

One can easily add other literature: Johnson-Laird (1983) on mental models, Fauconnier (1994) on mental spaces, numerous articles and book by Sebastian Löbner on quantification, the current Tilburg project led by Reinard Muskens on the connection between proof-theoretic semantics and cognition, the current Utrecht project led by Yoad Winter on bridging lexical and compositional semantics, and many others, among which Verkuyl (2008) which formalized the clearly mentalistic proposal for the Dutch tense system in Te Winkel (1866) in terms of Montague semantics. All these contributions belong to the second phase of the process of mathematization which naturally follows the first phase in which instruments contributed by mathematicians were (and still are being) tested on their possible usefulness.

A nice illustration of this process is given in Van Benthem (2008; 2014) which I hit on after having finished the present paper. His 2014-article appeared in a special issue on Logic and Cognition and it provides more relevant literature than could be mentioned in the present section, as do the other contributions to that issue. Van Benthem's contribution can be seen as representing a far less pessimistic view on the merger of truth-conditional logical semantics and the dynamic logic of general information-driven agency than transpires from Seuren's book. I share that optimism.

## 6 Conclusion

The preceding section offers some ingredients for countering Seuren on his expulsion of Montague semantics from the domain in which he feels well: the domain of processing the external world in terms of categories, viewpoints, evaluations and other parameters where linguistic forms link up with mental representations projecting on what is construed as the world. In my view, his urge for jackhammering the foundation of the Frege-Russell-Montague tradition so as to deny to it a valuable contribution is totally unnecessary given his interesting own programme set out in his chapter 8, in particular with respect to the question of how important the role of empty sets should be in a set-theoretical approach to natural language. If one is able as a reader to relativize Seuren's inclination to polish off his opponents, then what is left is a very interesting and high level contribution of a theoretical linguist to the interdisciplinary field of cognitive science. Hopefully his contribution to the second phase mentioned above will be judged on its mere content.

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