ENCOURAGING SCIENTIFIC PRACTICE THROUGH THE SEMANTIC ANALYSIS OF BRAZILIAN PORTUGUESE[1]

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Although the inauguration of Formal Semantics in Brazil dates back to the 1970s (BORGES NETO; MULLER; PIRES DE OLIVEIRA, 2012), it was from the 2000s that the related literature, previously restricted to postgraduate studies, started to gain introductory volumes for undergraduate students in order to prepare and attract future semanticists (ILARI, 2001; PIRES DE OLIVEIRA, 2001; CANÇADO, 2012; FERRAREZI JUNIOR; BASSO, 2013). In this scenario, *Para conhecer Semântica* (Editora Contexto, 2018), written by the linguists Ana Paula Quadros Gomes (UFRJ) and Luciana Sanchez Mendes (UFF), takes place in the introductory bibliography on Formal Semantics produced in Portuguese. Based on internationally recognized proposals that seek to formulate explanations of universal application, the authors analyze Brazilian Portuguese (BP) phenomena with current examples and jovial language. The book brings fundamental theoretical concepts to the area and also reflects important developments in Semantic research in recent years, such as the treatment of nominal structures and modifying expressions, for which the authors' own research has contributed significantly.

Like the pioneer *Semântica Formal: uma breve introdução*, by Roberta Pires de Oliveira (2001), the current *Para conhecer Semântica* is an introductory manual of Formal Semantics. It does not address other perspectives of Semantics, as does the also referenced *Manual de Semântica: noções básicas e exercícios*, by Márcia Cançado (2012), and *Semântica, Semânticas: uma introdução*, by Ferrarezi Jr. e Basso (2013). The differential of *Para conhecer Semântica* lays in its **organization** and especially in the **topicality** of the discussed data and theoretical approach, which reflects in the selection of the spotted phenomena and in the way they are presented. The authors depart from classic studies, mandatory for any semanticist, and get to recent developments in the area, where knowledge is constantly updated and major restatements become necessary in order to account for challenging empirical data.

The aim of the authors with *Para conhecer Semântica* is to present Semantics as a formal science, which seeks general, economic and logical explanations, from hypotheses that can be confirmed or falsified by the data. In this way, Semantics aims to describe a fundamental part of human linguistic knowledge, that is, "[…] how any

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native speaker produces meaningful sentences and understands well-formed sentences in their language." (p.9). The authors, then, promote scientific thinking using the *linguistic meaning* as the subject of investigation.

The book is organized in four chapters that contemplate, in the authors' words, "the three largest slices of a natural language", which are the *noun phrase*, the *verbal phrase* and the *modification*. Each part starts with the objectives of the chapter and concludes with indications of complementary readings and exercises, following the format of the collection *Para Conhecer*, by Editora Contexto. The Chapter 1 (p.13) introduces the field of Semantics, its object, and delimits the discussion of the book to the meaning at the sentence level. The aim is to determine the truth conditions of the proposition expressed by the sentence from the meaning of its parts, thus defining the *vericonditional* and *compositional* perspective of Semantics assumed in the book. Classical phenomena that are of interest to any Semantic perspective are then presented and analyzed, such as *ambiguity*, *anomaly*, *presupposition* and, under the label of *logical links*, the relations of *entailment*, *contradiction*, *synonymy*, and *contingent truth*. These phenomena reveal a fundamental part of our semantic knowledge, which is the ability to relate meanings and deduce one proposition from another. For example, how do we know that if 'John traveled yesterday' is true, necessarily 'John traveled' will also be true, but the opposite is not the case? We can say that 'John traveled yesterday' entails that 'John traveled', but 'John traveled' does not entail that John traveled yesterday (it may have been at any time in the past). Moreover, how do we know that in order to 'Dom Casmurro stopped trusting Capitu' to make sense, 'Dom Casmurro trusted Capitu' has to be true? The authors show how these operations, which we perform intuitively, relate to each other and extend our knowledge of the world, and present the syntactic-semantic mechanisms that trigger such operations, introducing the basic mathematical tools to formalize the explanation.

In the last two sections of Chapter 1, Gomes and Mendes discuss concepts such as the distinction between the *Sense* and the *Reference* of an expression, *predication*, and *compositionality*. Those are notions inherited from Philosophy and are theoretical assumptions upon which Formal Semantics is based. Proposed by Frege (1978), they were a theoretical leap in understanding how we relate the terms of the language to "things in the world", and how we calculate the truth of a proposition, in a time in which the meaning of a term used to be understood as its referent. For example, how do we speak about what does not exist, like 'Pegasus' and 'Santa Claus'? And what would be the referent of abstract terms like 'love', 'tiredness', and 'freedom'? Frege proposed that the relation between the term and its reference was not direct, but mediated by *meaning*, the *thought* expressed by the term. We interpret terms that name non-existent or abstract objects because we know their meaning, and to know more than one meaning for the same reference is to know more about the world.

Moreover, in Frege's time, the truth-value of a proposition was still calculated in the Aristotelian way: the meaning of a sentence was understood as a composition between a particular and a category. So, 'Bob Dylan is mortal' would be true if the particular

'Bob Dylan' belonged to the 'mortal' category. For Frege, this way of analyzing meaning did not account for transitive sentences like 'Bob Dylan wrote Blowing in the Wind'. What would be the particular and what would be the category in this most complex sentence? The Fregean output was to treat verbs as *predicates* – unsaturated but meaningful expressions – and their complements as *arguments* – saturated expressions that generate the saturated expression called *sentence* when combined with predicates. Formally, predicates came to be seen as *functions*, relations between sets. The 'write' predicate is a function that takes two arguments: 'Bob Dylan' from the set of writers, and 'Blowing in the Wind' from the set of the written things, and returns the sentence 'Bob Dylan wrote Blowing in the Wind', which expresses a proposition that we can evaluate as true or false. The solution brought with predication and compositionality was challenged by sentences like 'Mary thinks Bob Dylan comes to Brazil', in which knowing the reference of the embedded proposition does not contribute to calculate the truth value of the whole proposition. If 'Bob Dylan comes to Brazil' is false, it does not follow that 'Maria thinks Bob Dylan is coming to Brazil' is also false, because Maria may believe in something that is not true. Years later, Frege's observation culminated in the concept of *intensionality*, in which the meaning is still compositionally computed, but not according to its extension (or *reference*), but according to its meaning, its *intension*. This issue is retaken in Chapter 3, which is dedicated to the analysis of the verbal phrase. With this introduction on key concepts of Formal Semantics, Gomes and Mendes *illustrate a fundamental factor of the scientific doing*, which is to confront empirical data with theoretical predictions, to then reformulate hypotheses and refine the theory in order to offer a better account for the data.

Chapter 2 deals with the nominal phrase (NP), a topic of great prominence in the recent semantic researches for contributing, among other issues, to the understanding of the differences between BP and European Portuguese (EP). The chapter presents the types of NP and discusses the differences between noun and determinant phrases in subject position and in complement position; between massive names and countable names; and between defined and indefinite phrase. The authors analyze such phenomena by showing how BP data challenge traditional descriptions, and introduce formal analysis tools, such as notions of *atomicity* and *cumulativity*, *plurality* and *set theory*. In this chapter, the authors analyze data such as 'Eu comprei revista no domingo' ('I bought magazine on Sunday') and 'Eu comprei uma revista no domingo' ('I bought a magazine on Sunday'), and show that both are accepted in the BP, but with different interpretations, whereas in EP only the second sentence is accepted. They also analyze the difference between nouns that denote countable objects such as 'apple' and massive objects such as 'sand', pointing out the relevance of describing the semantic characteristics of each type so that we can explain why we naturally say 'Duas maçãs caíram no chão' ('Two apples fell on the ground'), but not '*Duas areias caíram no chão' ('Two sands fell on the ground'). In the same chapter, the authors also explore de semantics of plurality, the semantics of definitude, and the semantics of the generalized quantifiers. In this last topic, we find an analysis of the inescapable scope interactions triggered by the

generalized quantifiers, either among themselves, or between themselves and other operators.

The verbal phrase is the subject of Chapter 3, where the authors discuss topics such as argument selection and thematic roles; the expression of time and aspect; and the expression of mood and modality. The impersonal nature of some verbs, the expression of existentiality, and the possibility of one of the arguments selected by the verb to be an expression denoting not an individual or a set of individuals, but an *event,* are topics explored in this chapter. Such topics highlight the relation between the verb's nature and how it selects its arguments, which is treated by the authors from the perspective of thematic roles, thematic hierarchy, and verbal alternation, or *diathesis*. The theoretical tool introduced by the authors in order to deal with the notions of time and aspect are the proposals of Reichenbach (2011) and Vendler (1957) and, for the treatment of modality, the standard proposal of Kratzer (2012) is assumed, three classical approaches used to explain how we are able to talk about situations that are not "here and now". The expressions of past and future, inferred, possible, necessary or hypothetical situations, which require considering alternative states of affairs, enter into this range. In this chapter, a leading notion of semantic analysis at the propositional level comes more prominently into play, and it figures as an important rethinking of semantic theory to account for empirical data that, at first, challenged the theory. This notion is the *context*.

Reichenbach's relative view of time (2011) seeks to undo the triviality of sentences like 'John took a shower'. This sentence is only adequate if it is evaluated at some relevant time, which somehow relates to the current time because it is trivially expected that John has taken a shower in the past. The phenomenon is known to have been approached by Partee (2004) in her famous example 'I did not turn off the stove', where the author, from the point of view of time as deictic and relative, proposes to analyze tense as analogous to a pronoun, whose value is provided by the context. As for the aspect, besides the grammatical aspect expressed by the morphology, Gomes and Mendes deal with the lexical aspect showing how the verbs can be classified semantically according to the functional classes, just like they are classified syntactically according to their transitivity. Following Vendler (1957), the authors show how a semantic classification contributes not only to the categorization of verbs, but also to explain phenomena such as the distribution of certain adjuncts and the validity of arguments. For example, why can we say 'John ran *for two hours*', but not '*John run *in two hours*'? Or, why 'John was running entails that 'John ran', but 'John was crossing the street' does not entail 'John crossed the street?

At the end of Chapter 3, Gomes and Mendes present *mood* as a sentential mark that indicates that the sentence expresses *modality*. The limit is drawn between modality as a speaker's attitude and modality in the formal assumption, in which modals strictly express possibility and necessity. In other words, they differentiate the subjective view from the propositional view of modality. Following the propositional view, the authors analyze modal sentences in BP according to Kratzer's (2012) formal standard perspective, in which modals are operators on sets of possible worlds constrained

by contextual information that determine the modal interpretation in the sentence. A sentence like 'John can swim' expresses "many kinds" of possibility: John can swim because he was allowed to; or because he has the ability to; or because, based on what we know, 'he might swim'. Each meaning is a different proposition because it expresses a different thought. What determine the proper interpretation are the propositions provided by context, which are formalized as possible world sets. Thus, in the interpretation 'John can swim because he is permitted', 'can' is an existential quantifier on the set of worlds in which John attends the permissions granted to him.

In the analysis of modality, the authors retake the notion of intensionality and logical relations between sentences by showing that a sentence like 'John can swim' speculates on the possibility of the event of John swimming to be confirmed, but does not guarantee it as a fact, which is an evidence that an extensional analysis does not suffice for modality. The modal proposition, being true, does not grant the truth of the embedded proposition, so that even though John never swims, the modal proposition can still be true. For compositional analysis to be possible, one must resort not to the reference of the embedded proposition – its extension, its truth-value – but to its meaning – its *intension*, the *thought* expressed – formulated as a set of possible worlds.

In the fourth and last chapter, the context is also a key ingredient for the analysis of the third major slice of natural language, the *modification*, compressing the analysis of adjectives, adverbs, and intensifiers. The adjectives and the challenges they bring to a unifying compositional analysis stand out due to the variety of readings they receive according to the syntactic position in which they appear. Adjectives that can appear either in a canonical attributive position (after the noun or as a predicative) as well as before the name, alternating the reading from intersective to intensional, are especially challenging. For example, an adjective like 'poor' has an intersective reading in canonical attributive position – 'O menino pobre fugiu'[2] – and in a predicative position – 'O menino é pobre' ('The boy is poor'); but an intensional reading in 'O pobre menino fugiu' ('The unfortunate boy escaped'). For this (apparent) issue, the authors show how the observation of the degree adjectives as 'high' in 'John is high', and the interaction of this type of adjective with intensifiers, as 'very', and with comparative constructions brings contextual dependence as a tool for the analysis of adjectives. Relying on context, we can explain how we can say that John, who is 1.80m tall, is a tall man for a jockey, but a short man for a basketball player; or, how we can say that John is good, professionally speaking, from the information that John is a good physician. Thus, a unified treatment is presented: degree adjectives are intersective when we take into account the information provided by the context.

Gomes and Mendes close the last chapter with the adverbs. Traditionally defined as expressions that modify a verb, an adjective or another adverb, the adverbs make up a very diverse category. Some adverbs modify events – as in 'Maria cooks *well'* –; others indicate mode, time and place – 'John came home *at 5 o'clock*' – or modify

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[2]   Meaning the boy is poor because he has no money or goods.

the entire proposition – '*Unfortunately*, the product is out of stock'. Some intensify – 'Maria cooks *very* well' - others quantify – 'Maria *always / sometimes / never* cooks well' – and others are modals – 'Maria *possibly* cooks'. Some operate in the truth-conditions, as in 'Maria cooks *well*' (that is, she does not cook badly). Others express speech acts, as in '*Sincerely*, for me it is better to be without Neymar in the team', and do not interfere with the truth-conditions. The authors, therefore, treat the adverbs and adjectives according to the type of operation they perform in the sentence, showing that they go beyond expressing qualities. The authors admit that it is a linguistic phenomenon – if not the most – that is difficult to formulate theoretically, due to the richness of the lexicon involved, the diversity of operations they carry out and their strong dependence on the context.

The topicality of the examples is a highlight in *Para conhecer Semântica*. Some of them are drawn from known memes on social networks, which invigorate the analysis even for those already familiar with the themes. For instance, the notorious sentence 'O bêbado bateu na velha de bengala' ('The drunk man hit the old lady with a cane'), which is traditionally used for the analysis of structural ambiguity, is replaced by the playful 'Seu cachorro corre atrás das pessoas de bicicleta' ('Your dog runs after people on bicycle'), contextualized in a dialogue to which the dog's owner replies 'Mentira, meu cachorro não tem bicicleta' ('Liar, my dog has no bicycle'). The arrangement fetches the captivating element of surprise by bringing up the unexpected interpretation triggered by the sentence structure. The entire introduction to formalization is presented with illustrations, and graphic frames highlight key concepts.

With an accessible and witty writing, the authors start from traditional analyzes to the theoretical reformulations that became necessary when the linguists faced data that defied the theory. An important ingredient of these reformulations pointed out by the authors, and which lays the foundations for the reinterpretation of the field, is the formalization of the contextual contribution in Semantics. Formal Semantics is superficially defined as the area that studies the meaning out of context (Pragmatics would be in charge of analyzing the language in context), but actually it presents tools to formalize the contribution of contextual information, without which, as well shown along the book, usual sentences like 'João pode correr amanhã' (Is he allowed to run? Has he the physical ability to run? Might he run?), or 'João é alto' (John is tall, but compared to whom?), could not be fully interpreted.

The aim in attracting the beginner's interest to the semantic analysis is fulfilled in the way the book is organized, and pointed by the authors in final considerations. The phenomena are first presented almost informally, and aspects of logical formalization are slowly introduced by means of a powerful tool, which is the analysis of language data that are accessible to any speaker. The content of the book, in the way phenomena and data analyses are presented, leads the readers to realize that they have in themselves a potential linguist, in principle, by having the essential tool for any linguistic analysis: the speaker's intuition.

Gomes and Mendes wrap up *Para conhecer Semântica* with a substantial list of bibliographical references that brings together seminal texts on the phenomena approached, and also most recent proposals on which the analyses presented in the book were based, from national as well as foreign researchers. Thus, *Para conhecer Semântica* adds up to the essential bibliography in Portuguese for every beginner interested in Semantics, as well as it shows up as a potential guide for educators in the field.

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