QUESTIONS OF LOGIC, PHILOSOPHY, AND LINGUISTICS

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Abstract. There were in the past, just as there are in the present, several diverse attempts to establish a unique theory capable of identifying in all natural languages a similar, invariable basic structure of a logical nature. If such a theory exists, then there must be principles that rule the functioning of these languages and they must have a logical origin. Based on a work by the French linguist, Oswald Ducrot, entitled *D'un mauvais usage de la logique*, this paper aims to present in a concise manner two of the above mentioned attempts. They were elaborated in diverse epochs and different arguments were put forward to support them. The first attempt was in XVII century France and its theoretic basis was the renowned 'Port-Royal Logic'. The second attempt is recent and its theoretic support comes from Contemporary Logic.

Keywords: Logic; philosophy; linguistics.

1. Introduction

My intent in the present communication is to explicate, in summary form, two approaches to the relationship between logic and language that are significantly different from each other. Both, however, were conceived with the purpose of laying a foundation for a unique position that pretends to be able to identify in all natural languages a basic, constant, and always identical structure of a logical nature. One of the assumptions underlying these and other similar attempts is the conviction that there may be found within natural languages certain present and active principles, derived from logic, that are capable of determining the functioning of such languages in an exclusive way.

The two proposals which are the object of this communication were described and analyzed in exemplary fashion by the French linguist Oswald Ducrot, in a work entitled *D'un mauvais usage de la logique* (On an errant use of logic).[1] They are attempts that were elaborated in different eras, and, even though they share a common goal, are different in starting point, in approach, and in the trajectory they cover to reach that goal. The first proposal originated in the "general" or "philosophical" grammars of the 17th and 18th centuries, principally in France, and its theoretical foundation is the celebrated pair formed by the Logic and Grammar of Port-Royal. The second is later, and its theoretical foundation, although remaining within the scope of traditional classical logic, is contemporary. The basis and point of reference

of my exposition (but not its limit) will be the text by Ducrot cited above at the beginning of this paragraph.

Although the author of the text under discussion is a linguist, and even though his work, like the present article, presupposes technical knowledge derived from linguistics in order to be understood, the predominant perspective in both texts, above all in my own, is clearly philosophical or, more precisely, logico-philosophical. This may be verified without difficulty as much in the preceding paragraphs as in the ones that follow. It is enough that the reader carry out an attentive and unprejudiced reading for it to be seen that, the material examined here being of a linguistic nature, so also — necessarily and obligatorily — is the analysis made of it, the questions put forth in its regard, the method utilized, and the objectives pursued.

One aspect of Ducrot's article, which illustrates its particular interest for logic and philosophy, is the presence — implicit and surely not detected as such by the author himself — of elements dispersed throughout it. These elements, if properly united, are capable of opening up an alternative route for the construction of artificial languages indispensable to the formalization of logical theories. Such a route, of which Aristotle only gave an outline, consists in the formularization of artificial languages whose constitutive principles would not be in conflict with, or would be identical to, those we find active in structures characteristic of natural languages. A proposal, in short, that if properly developed, might wake us up to the fact that the importance of Aristotle for current logic is perhaps more than that of a dead letter.

While still in the introductory part of his work, before beginning the description and analysis of the two proposals to be examined, Ducrot mentions and distinguishes two preliminary notions which he calls the *logical function* and *logical structure* of a language. In accordance with his text, we may admit (and is even necessary to do so) that every natural language has, or can have, *a logical function*, aside from several other functions as well. The justification he provides for this is the presence in any natural language, with inevitable certainty, of a large number of sentences referred to as "declaratives", that is, of affirmations and negations susceptible to being taken as false or true. These sentences act as the components of reasoning — i.e., as premises or conclusions of arguments — and the possibility of the existence of reasoning presupposes the existence of such sentences.

The complete and correct linguistic description of declarative sentences would demand, therefore, that there be taken into account such facts as would be sufficient to allow the identification of the contingently potential existence of a *logical function* within any and all natural languages to be considered. However, not believing that the *logical function* of a language is the only or the most important of its functions, Ducrot doubts that a *logical structure* may be attributed to a language. Furthermore, he doubts that we can prove that the entire internal organization of a natural language is dominated by the unique objective of making reasoning viable. Ducrot's

text, which is the basis for my exposition, has the exact purpose of justifying these doubts.

2. First Proposal

What in my introduction I called "two approaches", "two attempts", or "two proposals", for laying a basis for the existence of a logical structure in natural languages, Ducrot prefers to call "... two forms that the belief in a logical structure of language can assume".[2] The first form would consist, according to Ducrot, in believing that the principles that govern the internal organization of the sentences of a natural language are determined, and can only be made clear, by the necessities of logical thought. Therefore, it is preliminarily required that for each class of meaningful elements of discourse — for each class of words, for example — there be a corresponding type of intellectual element, such elements being the components of the judgment that each sentence necessarily expresses.

In accordance with a tradition that may be traced back to the classical period of Greek philosophy, strictly speaking to Plato, but that was made widely known, above all, through the transmission of the logical works of Aristotle, the authors of the Port-Royal Grammar established that a complete judgment must always consist in affirming something of something else, that is, in attributing a property to a substance. From this it may then be concluded that the canonical form of the corresponding sentence is composed of three elements: the name of a substance that is the subject of the sentence, the name of an attribute that is the predicate of the sentence, and the element that binds the subject to the predicate (the copula), which may or may not be followed by the particle of negation. In conformity with a well known abbreviative notation, created in the Europe of the Middle Ages and particularly adequate to languages of Latin origin, the canonical form of a sentence would be, then, for affirmatives, *S is p*, where "S" is the subject, "p" the predicate, and "is" the copula.[3]

To illustrate the form *S is p*, Ducrot provides as an example the sentence *The table is big*. He adds that Arnauld and Lancelot, the authors of the Port-Royal Grammar, knew full well that a great number of real sentences in actual languages were not and are not, at least at first sight, constructed in conformity with this model, which is presumed to be imposed by the necessities of logical thought. Take, for example, the rather frequent case of sentences such as *The dog runs*, in which the linking element is apparently absent. Arnauld and Lancelot's response, which goes back to Aristotle, consists of affirming that *The dog runs* is only a contracted but equivalent form of *The dog is running*, where the three canonical components are once again visibly present.

Another case that the Port-Royal authors consider is that of Latin sentences such as *pluit* ("it rains"), where, in addition to the apparent absence of the copula, the predicate is also apparently absent. Their reply in this case is that the predicate is implied (understood) and that *it rains* would be equivalent to, for example, *God rains*, which in turn, as in the earlier case, would be equivalent to *God is the rainer*.[4]

Ducrot concludes from the analysis of these cases, which he unites in the single example above, that this approach (which he calls "logicist") is a reductionist one, and that it requires the distinguishing of two classes of sentences in natural languages: sentences that satisfy the requirements of logical thought, and "marginal" sentences that are apparently illogical. Ducrot then goes on to discuss two more examples, taken from the same source as the previous example, with the objective of illustrating how syntactic characteristics proper to the French language are treated as particular cases of preestablished necessities of a supposedly logical nature. Due to questions of economy of time and space, as well to the similarity of the two examples, I will limit myself to the last of them — the third in Ducrot's text, and the one that is more complex and that I find to be the most interesting.

In the paragraphs that follow I will cite Ducrot's commented summary of the above mentioned example from the Port-Royal Grammar. The example is concerned with explaining the rules of agreement for the French participle. In the passage under discussion, Arnauld and Lancelot try to justify, from what is said to be a logical perspective, the occurrence in the French participle of two different forms of agreement, each of them illustrated in the following sentences: *La soupe que j'ai mangée* and *J'ai mangé la soupe*.[5] Ducrot reproduces the solution elaborated by the Port-Royal grammarians in a summary, which he gives in three parts that are followed by a commentary. Below is a translation of this passage of Ducrot's text:

> 1) It is natural that the determinative element be placed after the determined element (for example, that the adjective be placed after the noun to which it refers) and, on the other hand, that the determinative element agree with the determined one. (Note that neither the Port-Royal authors, nor the grammarians of the 18th century, present these rules as properly logical, but only as "natural", it being understood by this that they constitute the only possible representation, in the linguistic sense, of the logical subordination of the determinative element to the determined one).

> 2) It is therefore natural that order and agreement occur at the same time in *La soupe que j'ai mangée*, if it be admitted that in this in case *mangée* [eaten] is a type of [feminine] adjective, with a passive meaning, determining the [feminine] noun *soupe*.

> 3) It is not abnormal, then, that there occur *J'ai mangé la soupe* (without agreement and with *mangé* in front), if it is admitted that here *mangé* [eaten] is a gerund, that is, the noun form of the active verb, and that it

designates the action of eating. The phrase is then understood as 'I possess the action of eating the soup' (= 'this action henceforth pertains to me').

I will not seek to discuss this description, much less its precedents. It is only necessary to note the intellectual attitude that it illustrates. The linguist — before any consideration of the linguistic data — believes him or herself able to establish certain necessities, be they purely logical (examples 1 and 2) or related to the tendency to manifest logical relations in natural way (last example). After that, he or she analyzes the linguistic facts in such a way that they appear as particular cases of these necessary constraints. This occurs by means of reductions (example 1), lists of exceptions (example 2), or distinctions (cf. the distinction of two different participles in example 3).[6]

Before moving on to the concluding lines of this section, I believe it to be of a certain utility to add some comments that will make it possible for me to formulate a hypothesis of a clarifying character relative to item three of the passage cited above. Let us note at the beginning that the present participle of the French verb *manger* (to eat) is *mangeant* (eating), and that the gerund ("the noun of the active verb") is formed by the present participle preceded by the preposition *en*, resulting in *en mangeant* for the verb in question. However, if there were a form of the "noun of the active verb" such that, in using it, we referred to a moment in time previous to that to which we refer when using the present participle, it would then be "natural" that, in doing so, we would recur to the past participle, that is, to *mangé* (eaten). It is thus probable that the Port-Royal grammarians, aside from other reasons they put forth, had this in mind when they affirmed the past participle *mangé* to be a gerund.

In any case, independently of the relevance of my hypothesis, it seems inevitable that one occasionally has the impression that Arnauld and Lancelot's explanations — although generally ingenious and even, at times, surprisingly ingenious — are constructed to satisfy presuppositions that impose consequences that are not always concordant or compatible with what can be verified within the prosaic scope of the facts. In addition, the basic presupposition that very much guides the work of the Port-Royal authors, as well as a considerable number of the 18th century grammarians who were influenced by them, is that the disposition of the meaningful elements of each of the sentences of a natural language will always reproduce, in ineluctable but not always immediately visible way, the internal organization of the thoughts within our spirit or, as we would normally say today, within our minds.

Such a postulate not only makes possible the acceptance of the arbitrary character of the linguistic sign,[7] but, beyond this, two important consequences, among others, may also derived — both this time in evident dissonance with Saussurian linguistics. The first is the possibility of the affirmation that, in the above mentioned

languages, there is a correspondence between what it is logical and what is natural. The second is the conception of a syntax that is necessarily, and not arbitrarily, motivated.

3. Second Proposal

The second of the two forms that "the belief in a logical structure of language can assume", would consist in the conviction that the semantic value of determined elements of a language — words, phrases, expressions etc. — coincides with their logical value, that is, with the *logical function* that they contingently exert when a conclusion is inferred from established premises. Let us consider, for the purposes of illustration, the simplest case of only two sentence models. It is said that there is logical inference between them when we can, independently of any particular empirical circumstance, conclude one from the other. Thus given two semantically well formed sentences, one of them having the form *Some x are y*, we will be able to correctly infer, and always so, another sentence that has the form *Some y is x*. From *Some men are mortal*, for example, we may infer *Some mortals are men*, and thus, successively, for each new substitution of *x* and *y* that allows us to generate semantically well formed sentences.[8]

For Ducrot, the logical value of a sentence is given by its "logical properties", that is, by the set inference models in which it can participate as a premise or conclusion. These properties, however, would depend on the occurrence in the sentence of certain words such as *some*, *all*, *if*, *and*, *or*, etc., that would determine the logical behavior of the sentences in which they occur, thus fixing the number, as well as the form, of the inferences in which the sentence can participate. It would have to be admitted, therefore, that a sentence where at least one of these words does not occur would be without a logical function in the language to which it belongs. However, in the natural languages that are better known within our cultural environment, Portuguese and English, for example, the words referred to are absent in a considerable number of declarative sentences,[9] as well as from the majority of sentences which express questions, orders, requests, commands, doubts, etc. This fact alone is sufficient to make impossible the identification of the *logical structure* that can be detected in one of the subsets of sentences in languages mentioned above — that subset whose elements are endowed with a *logical function* — with the structure of the entire set of sentences into which these elements are inserted.

Ducrot, however, opts for a different strategy and prefers to present another type of argument in opposition to the second of the proposals summarized in this communication. For Ducrot, the members of the class of words supposedly capable of determining the set of logical behaviors for the sentences in which they appear,

would not possess a constant logical value, at least in some languages. In order to prove this, Ducrot must proceed to a detailed and enlightening examination — reproduced here only in part — of important aspects of the semantic behavior of the connective *and*, as well as of the expression formed by the conjunction of the words *if* and *then*, all three pertaining to the class of so-called "logical words". The examples which he provides were taken from French, but their validity can undoubtedly be extended without difficulty to several other languages.

Following the order adopted by Ducrot, let us start with the connective *and*. Analyzing this first example, the author calls our attention to the fact that the logical properties of the connective seem to be, at first glance, reasonably simple. Thus, from the sentence *The table is big and square*, one may at the same time infer both *The table is big* and *The table is square*. The word *and* makes it possible, therefore, to infer from *X is y and z* that *X is y*, as well as that *X is z*. What can be said, however, of a sentence such as *The flag is blue and red*? It is affirmed, in this in case, that the flag not only has one of the two colors, but both at the same time, which makes inviable the separate inferences that *The flag is blue* and that *The flag is red*. Another example, which shows that this is not an exceptional case, is the sentence *Peter would be happy to have whiskey and water*, which of course can not mean that he would be happy to have only one of the two. Ducrot's last example involving this connective is *Peter and Pablo will come alone*, which can mean that the two will come together, without anyone else, or that each of them will come by himself. The first alternative would make inviable an inference of the type given in the first example.

To the difficulties stated in the previous paragraph, adherents to the proposal under discussion would answer, as a rule, in one of two usual ways. The first would be the reply of those who prefer to say that there are several homonymous connectives in the language in question, and that only one of them would authorize the inference in the pattern described above. In this way, the idea of a connective with constant logical value would be preserved. The other response would be that of those who choose to provide different analyses for declarative sentences where the semantic value of the connective is not the same. Thus, *The table is big and square* would be a sentence composed of two others, namely, *The table is big* and *The table is square*, whereas in *The flag is blue and red*, we would have a sentence with only a single attribute, composed, however, of two words: *blue* and *red*.[10] With this procedure it is possible, once again, to maintain constant the logical value of the connective that links the two different attributes. Ducrot refuses both of these possible responses, not believing that they are adequate to the purpose of obtaining a good description of natural languages.

Although sufficient for explaining some of the undeniable variations in the logical value of the connective, the analysis in the previous paragraphs does not cover — and certainly does not intend to cover — the totality of types of sentences in which

it can occur. These sentence types would cover all of those sentences by which we could enumerate the set of the connective's logical and semantic properties. It is with analogous results, and probably with similar expectations, that Ducrot analyzes the expression *if–then*. In natural languages, this expression may express, among other things, the relation that is considered to be no less than the proper object of logic. In this case, therefore, Ducrot uses examples in which the presence of the word *then*, for reasons of economy and style, remains implicit. The first example illustrates the case in which the real logical value of the expression coincides with the value that is postulated as unique and constant by the adherents of the position being criticized — that is, the case where the meaning attributed by logic to the consecutive relation is identical to the meaning of the linguistic expression that expresses it.

In fact, in the sentence *If the weather is good, I will go out*, the semantic value of the word *if*[11] seems to coincide with the meaning given by logic to consecutive relation that it may express. To test if this indeed occurs, Ducrot applies to this sentence, as well as to the rest of his examples, the so-called *law of contraposition*. In accord with this well known law of logic, any two conditional propositions are logically equivalent when the first has the form *If p, then q*, and the second *If not q, then not p*.

Thus, if the logical value of the expression *if – then* always coincides in natural languages with the consecutive relation in logic, the meaning of a sentence that has the first form would always have to be identical to another having the second form. When applying it to the sentence in our first example, we will get, after some small necessary adjustments, the result *If I do not leave, it is because the weather is not good*, whose content is equivalent to the first sentence and confirms the correspondence between the logical value of the *if, then* expression and of the relation that it, in this case, really expresses. The same test, however, shows that the correspondence that was verified here is absent in several other types of sentences that also contain, even if only implicitly, the pair of words *if, then*.

To begin with, let us consider the case of *If you want to come, you have the right*. Applying the same law to this new example, we get *If you do not have the right to come, is because you do not want to*, a sentence whose content is by no means equivalent to the previous one. In order to prove that we are not dealing with an exceptional case, Ducrot completes his sequence of examples with two others, beginning with *If you are thirsty, there is beer in the refrigerator*. Applying the same test to this sentence, we have *If there is no beer in the refrigerator, it is because you are not thirsty*, an absurd result sufficient to prove that the application of the law, which should — as in the first example — maintain the original content unchanged, once again modifies it, doing so in a way that is almost grotesque. To finish, let us move on to *If he comes, I will not receive him*, with the resulting *If I receive him, it is because he did not come*, which Ducrot pertinently refers to as "surrealist". It thus may be

seen that use of *if, then* in natural languages does not confirm the supposition that it has a logical value that is constant and that is identical to that of the consecutive relation it may express.

In response to the additional difficulties noted in the previous paragraph, adherents of the conception just examined would, according to Ducrot, make use of an expedient which we have already come across. I am referring to the option of analyzing, in a different manner, sentences in which the semantic value of the connective is not the same. Analogously, each type of change in content of the pair *if, then* would deserve a separate analysis that is presumably adjusted to it. Thus the sentence *If you want to come, you have the right* would, for example, be seen as a contracted form of *You have the right to come, and, if to want to come, you may use this right*. Applying the law of contraposition to this last sentence, we get, with the necessary adaptations, *If you do not have the right to come, it is because you do not want to*,[12] the same sentence that we previously discarded because it does not preserve the original content. Proceeding in a similar way, it would be possible to find a solution for each recalcitrant example and to preserve the idea of a constant logical value for the pair *if*, *then*. In concluding the part of his work which discusses the "second proposal", Ducrot observes that the versions of it that he criticizes as "logicism" because they demand a significant alteration of the facts, may not be presented as imposed by those facts.

4. Conclusion

The idea that underlying every natural language there is a structure that in some way reflects the laws that govern the correct construction of our reasoning, is what characterizes and is the basis for the two proposals discussed in this work. The first proposal, that of the authors of the Port-Royal Grammar and their followers, may be verified to the extent that the organization of the elements of a sentence reproduces the components of the thought it expresses. This supposed identity between thought and sentence may thus be considered the basis of the proposal defended by the authors of Port-Royal and their followers.[13] It is an opinion that we surely cannot to impute to the adherents of the more recent proposal. The question regarding the theoretical basis of the second proposal examined here is placed by Ducrot at the end of his work, and the response he provides is only of a hypothetical nature. For Ducrot, logic in its origins is not truly concerned with sentences, but only with propositions, which are the judgments that certain sentences express. Its interest should be directed toward the study of the relations of inference between propositions, and its main objective should be to formulate the laws that allow us to evaluate the correctness of human reasoning. In order to reach this objective, the solution that

Ducrot judges to be most natural is the construction of a language that satisfies two conditions, namely:

> 1) Each proposition is expressed by one and only one formula of this language.
>
> 2) The language must make possible the articulation of rules of the following type: if a proposition is expressed by a formula of type X, there may always be inferred from it the proposition expressed by a formula of type Y. Thus, to describe the laws of inference between propositions, one makes the formulas correspond to the propositions and defines, between formulas, a relation parallel to the relation of inference existing between propositions (this procedure is no other than the procedure of all *formalizations*: the set of formulas is taken as a *model* in which the intuitive relation of inference between propositions is *conserved*). The creation of such an artificial language is necessary for explaining the laws of inference between propositions and for giving them a precise formulation.[14]

Having said this, Ducrot is able to formulate, in the passage cited below, the concluding response which, in his opinion, must be seen as a hypothetical explanation of the theoretical basis of the second proposal under examination. According to Ducrot:

> All of this would not have consequences for linguistics and would not have led to what I have called logicism, if it had not been the cause of the following fact: the artificial language used to translate the propositions is a part of natural language. The language which Aristotle used to state the different types of possible judgments and to formulate the rules of reasoning is nothing more that a subset of ordinary language which includes expressions such as *Some men are mortal*, *Some mortals are men*, etc. However, it is evident that in this part of ordinary language, chosen to allow the formulation of rules of the inference, the logical morphemes of which we speak (*and*, *if*, *some*, etc.) have a clearly defined logical value (this part of language was chosen to lead to precisely this result). As a result, one may be tempted to think (it is this that I have called logicism) that this subset of ordinary language which serves to make explicit the rules of inference is truly the archetype of language and, in particular, that the logical morphemes must possess, in the totality of language, the properties that they possess in this artificially delimited subgroup.[15]

Ducrot ends his article by stating that he has solely intended to question the vain attempt to transform natural languages into logical languages, as if there existed, hidden in the essence of every natural language, a unique structure which is always identical, constant, and of a logical nature.

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Resumo. Houve no passado, e há no presente, tentativas várias, diversas entre si, de fundamentar uma posição única que acredita poder identificar em todas as línguas naturais uma estrutura básica, sempre idêntica, e de natureza lógica. Se assim for, há princípios que regem o funcionamento de tais línguas e esses princípios são oriundos da Lógica. Com base em um trabalho do linguista francês Oswald Ducrot, intitulado *Sobre um mau uso da Lógica*, a presente comunicação pretende apresentar resumidamente duas das mencionadas tentativas. Elas foram elaboradas em épocas diversas e são diferentes os argumentos destinados a sustentá-las. A primeira é originária do século XVII francês e o seu alicerce teórico é a célebre Lógica de Port-Royal. A segunda é recente e o seu fundamento teórico é a Lógica Contemporânea.

Palavras-chave: Lógica; filosofia; linguística.

Notes

[1] The original version was published in Martinet, J. (ed.) *De la théorie linguistique à l'enseignement de la langue*. Paris: PUF, 1974, p. 129–43. A translation into Portuguese has recently been published in *Educação e Filosofia* **23**(46), jul./dez. 2009, p. 309–21.

[2] Cf. p. 130 in the original text or p.310 in the translation.

[3] Note that "predicate" here refers only to *p*, the attribute. In traditional grammar, as is well known, "predicate" refers to the part of a sentence comprised by the verb and its complements.

[4] As we are dealing in the model *S is p* with the canonical declared form of a sentence, the cases of expansion are taken a predictable and, as a matter of principle, aproblematic, once it is assumed that the reduction to the base model can always be performed without difficulty and, above all, without losses.

[5] Literally translated: *The soup that I have eaten* and *I have eaten the soup*. The usual translation into English would be: *The soup that I ate* and *I ate the soup*.

[6] Cf. p. 134–5 in the original text or p. 313–4 in the translation.

[7] Note that to claim the identity between the natural disposition of the meaningful elements of a sentence and the organization, in the human mind, of the components of the thought that this sentence expresses, does not imply affirming a necessary similarity between, for example, the phonic substance of a word and its referent.

[8] Note that to claim the identity between the natural disposition of the meaningful elements of a sentence and the organization, in the human mind, of the components of the thought that this sentence expresses, does not imply affirming a necessary similarity between, for example, the phonic substance of a word and its referent.

[9] As an example, it is enough to refer to any affirmative or negative sentence that does not contain another element beyond those in the canonical form *S is P*.

[10] Strictly speaking, two words united in a single semantic unit, each having the function of an attribute.

[11] The complement *then* here remains implicit (understood).

[12] That is, *You do not want to come, and therefore you will not use the right that you would have used if you had wanted to come*.

[13] This refers to a presupposition that, if it were true, would also be sufficient, because, as is well known, every judgment can be correctly expressed in the form of a single sentence.

[14] Cf. p. 140 in the original text or p. 318 in the translation.

[15] Cf. p. 140–1 in the original text or p. 319 in the translation.