

## **Commentary on Giulio Benedetti's**

### ***Semantica Operativa.***

#### ***La semantica in termini di operazioni mentali.***

#### ***Parte prima. Principi generali, metodologia e tecnica di analisi***

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Since Silvio Ceccato, in the second half of the last century, introduced a new paradigm of research in linguistics and semantics (Ceccato, 1969, Ceccato and Zonta, 1980), and more in general in the studies of mind (Ceccato, 1972, Vaccarino, 1974), Benedetti's *Semantica Operativa* (Benedetti, 2001) certainly represents the first, most important and serious attempt at setting down and organizing the methodological principles and analytical techniques that should govern the activity of linguists working within this scientific paradigm. According to this new scientific paradigm - variously termed "operative methodology", "operative analysis", "operative technique", "third cybernetics" (Ceccato, 1974), "constructivist semantics" (Vaccarino, 1988) – everything we name and designate, either through a single word or an entire text, is the result of the operations we mentally perform to construct it. Contrary to what traditional linguistics maintains, the counterpart of a word or text is no longer the object of the world the word or text refers to, or the abstract concept or idea of such an object, but the mental operations making up the thing we name. It is precisely such mental operations that represent the meaning of words and texts. This paradigm of research rests on the basic idea that we perform a special kind of activity, that is, mental activity, that allows us to give a form to the world we live in: a form that, depending on the way we use and apply our mental activity, we can variously experience as perceptions, feelings, emotions, ideas, concepts, thoughts, meanings, and so on. Things do not exist in themselves, independently of our mental activity, but are the product of such activity. Consequently, meanings, as well as perceptions, feelings, emotions, ideas, concepts, thoughts and the other kinds of experiences we have, can be analyzed in terms of the mental operations we have to perform to construct them up.

This paradigm of research has given birth to a series of pioneering and original studies on meaning and language – just to mention the most relevant ones: Ceccato, 1969, 1987, 1990, Ceccato and Zonta, 1980, Ceccato and Oliva, 1988, Glasersfeld, 1989, Marchetti, 1993, 1997, Vaccarino, 1981, 1988, 1997, 2000 – that, despite being variously characterized by different analytical models, nonetheless share the same basic theoretical assumptions, and, above all, the view that the fundamental building block of mental activity is represented by attention. Like the majority of pioneering works, however, these also suffer from an excess of enthusiasm and expectations for the new perspective that are not duly counterbalanced by an adequate control and verification of the results achieved and the analyses performed. As a partial justification, however, it has to be noted that, contrary to what happens in other fields of research, such as physics or chemistry, in which the object to be analyzed can be directly and publicly observed by everyone, in this specific field of research, the object, that is, mental activity, is, as Ceccato used to term it, a “private” phenomenon, or, as Benedetti prefers, a phenomenon that cannot be directly observed by anyone but the person performing it. This fact severely reduces at present the possibility of verifying the correctness of the analyses carried out by researchers. Until the proper technology and analytical procedures are developed to investigate what happens at a physical level, there is no other possibility for researchers to verify their analyses than to rely on the effectiveness and completeness of their model. Benedetti’s work aims precisely at providing the methodological apparatus necessary to carry out just this kind of research in a phase of absence of the techniques and procedures adequate for verifying them at a physical, or otherwise observable, level: an apparatus that, trying to take into account as many aspects and factors as possible, both directly and indirectly related to language, is intended to supply researchers with the proper constraints capable of reducing the possibility that they make mistakes when performing the analyses of meanings.

The issue of which methodological principles and analytical techniques are to be adopted to adequately analyze meanings was only tangentially and incidentally tackled by Ceccato. He principally relied on two main methods. Firstly, the possibility of analyzing meanings in terms of a combination of few basic elements: the attentional states. This method is reminiscent of Mendeleev’s way of classifying chemical elements: while the number of the basic elements is very limited, their combination yields a theoretically infinite number of outcomes. Secondly, a general capacity of researchers to slow down their mental activity, and to analyze and describe their mental operations while performing them. He also proposed some specific techniques for the analysis of the meaning of words, such as using the same word in different linguistic contexts, comparing the different situations and describing what changes and what remains constant (if we want to analyze, for instance, the meaning of the word “at”, we will compare phrases where the word “at” is held

constant while the context changes, such as “at home”, “at night”, “at first”, and so on); or, describing the same identical physical situation by using different words, or different physical situations by using the same word, and analyzing what changes and what remains unchanged. However, he was not worried about verifying and systematizing such methods and techniques as much as he was about developing his model of mental activity, performing analyses, applying his findings in various and different fields (automatic translation, pedagogy, aesthetics, etc.) and publicizing his work.

Undoubtedly, Vaccarino is more rigorous than Ceccato as far as the systematic nature of the work is concerned. Vaccarino has built a well-structured analytical system based on few assumptions, whose organization itself should represent – according to him - the guarantee of the correctness of the analyses. This very organization, however, representing the only kind of constraint researchers should satisfy, can bias their work to the point of making them overlook or neglect other equally important factors, and consider meanings as abstract entities completely separated from the phenomenal dimension in which they are originally used and experienced: consequently, their analyses can be greatly prejudiced.

It is mainly through a close and accurate critical revision of Ceccato’s and Vaccarino’s methods and works that Benedetti gets to propose some fundamental principles and rules to be observed by whoever wants to do linguistic research following the operative paradigm. For instance, as regards Ceccato’s and Vaccarino’s proposal for analyzing meanings by starting from the possible combinations of few basic elements, Benedetti argues (chapter I) that it raises many theoretical and technical problems:

- In Ceccato’s system, the exponential growth of the number of possible combinations is not accompanied by a corresponding growth of the number of words: by combining more than 4 attentional states, the number of combinations that do not correspond to any Italian word increases dramatically, leaving too many combinations without a linguistic counterpart (Vaccarino’s system, despite not being so severely affected by this problem as Ceccato’s, is not exempt from it nonetheless). This fact poses a serious doubt as to the usefulness of the proposal.
- The mathematical rigidity of the system of combinations entails a complete and exact classification covering all the possible meanings. Such classification should be mirrored by a sort of universal language of thought, a kind of *mentalese*, shared by all human beings. What linguistic diversity shows, on the contrary, is that such a universal language of thought does not exist: some languages possess words that some other languages do not, and not always is

it possible to exactly translate a word or sentence from one language to another. If a *mentalese* really existed, such problems should not occur.

- A system of analysis based on the combination of a set of basic elements works on a deductive principle. Deductive systems are risky: if even one of the basic elements or assumptions is wrong, the whole system can collapse. An inductive approach would seem to be more suitable.
- The very idea of the possibility of obtaining a system of meanings by combining few basic elements implies the idea of a set of combinations of increasing complexity: the higher the number of elements combined, the higher the complexity of the corresponding meanings. Such a system can ideally be partitioned into levels of combinations of increasing complexity: a first level of meanings formed by only one element, a second level of meanings formed by the combination of two elements, a third level of meanings formed by the combination of three elements, and so on. If we try to relate this hypothesis of a system of meanings of increasing complexity with children's language development, we face two alternatives: as soon as the neuronal correlates of the basic elements and of their combinations are sufficiently developed to be able to work, children can have:
  - (a) an immediate language development: they form all the possible combinations in a very short time; or
  - (b) a gradual language development: children form the combinations gradually, over the years, according to the level of complexity of the combinations.

Children's language development, on the one hand, contrasts sharply with the first alternative: children need many years to learn a language, and, albeit with individual differences, seem to develop their vocabulary following a common kind of order (for instance, words pertaining to specialized vocabularies are learnt later than common words). On the other hand, it does not reflect the levels of combinations of increasing complexity inherent in Ceccato's and Vaccarino's systems. Children do not learn to say first "thing", then "I" and "it", then "beginning", "end", "individual", etc., that is, they do not follow the levels of Ceccato's system, nor those of Vaccarino's: which, even though it does not make implausible the second alternative (gradual language development), certainly makes highly implausible Ceccato's and Vaccarino's analyses.

Benedetti's criticism (chapter II) of Ceccato's and Vaccarino's position on perception is equally important for the development of a methodology of the operative studies. According to Ceccato and Vaccarino, human beings' capacity to build and use what they call "mental categories" - that is,

words such as “beginning”, “end”, “and”, “or”, and “but” that do not designate sensible, observable, physical or psychological things, but only non-observable, mental ones (Vaccarino, 1974) – precedes the capacity to perceive. To be able to perceive a pear, for instance, one should perform at least the mental operations corresponding to the mental categories of “thing”, “figure” and “volume”. Benedetti claims that such a hypothesis meets with some insurmountable difficulties:

- If we assume that the capacity to build mental categories is a prerequisite for perception, then we have to allow that all animals that are able to perceive *eo ipso* build mental categories. This implies admitting that even very simple and primitive animals such as worms have the capacity to build mental categories, at least those necessary to perceive. Moreover, if we adopt Ceccato’s and Vaccarino’s systems of classification of meanings (which, I recall, are organized into levels of combinations of increasing complexity), we should also assign these animals the capacity to build at least all those mental categories whose structure is simpler than, or equal to, the ones necessary to perceive. Consequently, they should be able to build and conceive mental categories such as, for instance, “subjective”, “objective”, “reason”, “logic”, “phenomenon”, “general” and “particular”, which in Vaccarino’s system have a simpler structure than “circle”, a category essential for perception: which indeed seems to be highly implausible.
- The assumption that the capacity to build mental categories precedes the capacity to perceive conflicts with evidence from children’s language and mental development: while children show possession of perceptive capacities from the first months of their life, they do not show the capacity to use and understand words designating mental categories until 12-18 months.
- If a child cannot perceive until she develops the capacity to build the mental categories necessary to perceive, how can she learn from adults’ words and gestures those very mental categories? How can adults transmit to her the capacity to correctly build and designate mental categories if she has not yet acquired the capacity to perceive the words and gestures referring to those mental categories? How can she relate the sounds of those words to what they mean if she is not able to perceive them?

All these counter-arguments lead Benedetti:

- To hold that perception precedes the capacity to build mental categories both in the zoological scale and in the ontogenesis of the individual. It is perception that provides the “raw material” necessary for the child to build mental categories: once built, mental

categories get free from perception, in the sense that they can be used both in physical and pure mental contexts, and applied both to physical things and other mental categories. There can exist, therefore, beings capable of perceiving without being able to build and use mental categories, but there cannot be beings capable of building mental categories that cannot perceive (chapter III).

- Consequently, to distinguish perception from mental activity: perception is not, and must not be mistaken for, mental activity (chapter III and IV). When we perceive an object, for instance a “trumpet”, we do not perform any kind of mental activity, we do not construct any mental categories: we simply perform a perceptive activity, which occurs according to its own rules that differ from those specific to mental activity.
- To reject Ceccato’s and Vaccarino’s method - reminiscent of Mendeleev’s one – of analyzing meanings on the basis of a restricted number of basic elements that can be combined according to a likewise limited number of combinations. Contrary to such a deductive strategy, Benedetti adopts an inductive one. The set of the basic elements is not exhaustive, determined once and for all, but is open: it can always be widened, reviewed and ameliorated (chapter IV).
- To reject the hypothesis of the existence of a universal language of thought, or *mentalese*: the great diversity existing between various languages suggests that people speaking different languages use different mental categories having different structures, as is the case, besides, with usages and customs (chapter IV).

and to safeguard the following assumptions (chapter IV):

- Mental categories are the product of our mental activity: they are actively constructed thanks to the mental operations we perform, and are not a mere reflection of a reality existing in itself and independent of our activity.
- Mental categories can be analyzed in terms of the mental operations necessary to constitute them.
- Attentional operations represent the most fundamental kind of mental operations, despite not being the only one.

After having critically, scrupulously and thoughtfully reviewed Ceccato’s and Vaccarino’s work – a job that anyone dealing with the operative studies should indeed accomplish, their work representing the touchstone in this specific research paradigm -, Benedetti delineates the

methodological principles to be followed and the techniques to use when analyzing the meanings of words from the operative point of view (chapter IV):

- The first thing to do is to ask oneself: “What mental operations *can* I perform when I use a certain mental category?”. This question has the advantage over Ceccato’s original question: “What mental operation do I perform when I use a certain mental category?” of highlighting the limitations we undergo when using a mental category. Indeed, the use and application of a given mental category is highly constrained both by its own structure and by the situation to which it is applied. Not all mental categories can indifferently be applied to all situations. Certain mental categories can be used only in certain situations, and not in others: “when”, for instance, can be applied only to temporal situations, and not to spatial ones. Being aware of the limitations of application of a given mental category represents the first important step towards the comprehension of its structure. Indeed, if we know when the mental category can be applied and when not, and if the physical situation where the mental category is used is known (a prerequisite satisfied by the fact that perception precedes, and is independent of, the use of mental categories), then we should have all the elements necessary to identify the structure of the mental category:

<i>Known variables</i>	<i>Unknown variable</i>
Physical situation + Rules of applicability of the mental category	> Structure of the mental category

The path from the two known variables – the physical situation and the applicability of the mental category – to the unknown one – the structure of the mental category – is the same for both the child who is learning to build her first mental categories and the researcher who has to identify the structures of the mental categories. There is a difference however between the child and the researcher: while the former, when learning words, is already able to perform the basic operations necessary to build mental categories, the latter has to get to identify the structures of mental categories through hypothesizing the kind and set of such basic operations.

- The second thing to do is to try to identify and make a list of the words that presumably correspond to those mental categories that have the simplest structure. In this way, on the one hand, we avoid neglecting all those mental categories we could occasionally not have thought of. On the other, we prevent the philosophical tradition from influencing us: an influence that even Ceccato and Vaccarino, admitting that categories such as “object”, “time”

and “space” are more fundamental and simpler than others, could not always escape. Benedetti lists a series of criteria serving this purpose. According to him, the simplest mental categories are those designated by the words that:

- (a) children begin to use first;
- (b) are used very frequently in common language (prepositions, conjunctions, etc.);
- (c) have a general meaning, and can substitute words having a similar but more specific meaning. For instance, the Italian word “spazio” (“space”), which the philosophical tradition considers as a basic category, can be substituted by “posto” (“place”) in many cases, much more than the former can substitute the latter. Consequently, contrary to what the philosophical tradition maintains, “posto” seems to have a more general and basic meaning than “spazio”;
- (d) we cannot do without when speaking;
- (e) are not composed by other words;
- (f) appeared in the remotest time.

Benedetti proposes dictionaries and grammar books as possible sources from which one could draw the list of the mental categories having the simplest structure (permit me to include also the lists of children’s first words). To these, however, he prefers another one, the set of stems and roots of the Indo-European language, because, affording the minimum number of words satisfying most of the criteria defining structural simplicity, it does not present the same problems of the other two.

- The real analytical work consists in using the mental category to be analyzed in different contexts - or, conversely, in keeping the same context while changing mental categories - and identifying what remains constant and what changes. If we want to analyze, for instance, the word “in”, we will compare its use in clauses or phrases such as: “sitting in an armchair”, “the key in the lock”, “to be in love”, etc., and will try to identify what these different situations share. This method was widely used by Ceccato (Ceccato & Zonta, 1980). Benedetti suggests that in using it the researcher should take the precautions of limiting the examples to physical situations, and of excluding the figurative and extended use of the terms: in such a way, the researcher will avoid dealing with more than one unknown factor at a time.
- Another important analytical strategy consists in comparing the word to be analyzed with its synonyms (and conversely, with its antonyms): the comparison can indeed reveal the differences and similarities between the former and the latter.



- A very important support for the analysis of words comes from etymology. It helps corroborate or refute analyses in that it allows the researcher:
  - (a) to understand if two or more words have a common root, and hence a common structure;
  - (b) to recognize if a word results from the composition of two or more words;
  - (c) to ascertain how old the word is, and hence how simple its structure is.
- Another important source of evidences that can confirm or disprove the analyses is represented by the study of gestures accompanying speech. Gestures are fundamental in language learning: when speaking, and teaching words, to children, adults tend to accompany their speech with them. They serve as a primordial and privileged tool for piloting the attention of other human beings: they share this function with words, and this is why analyzing them can help understand the attentional structure of mental categories.

Undisputedly, the set of principles and techniques proposed by Benedetti represents an indispensable tool for the researcher who wants to carry out analyses of the meanings of words from the operative point of view. Obviously, the necessary condition for this activity to succeed is that the researcher possesses a valid set of basic mental operations by means of which he can carry out the analyses. In order to identify such a set of operations, Benedetti proposes to rely on introspection (chapter V): thanks to it, one should be able, basing oneself on, and carefully considering, the analyses already done by Ceccato and Vaccarino, to inductively find the basic operations (both attentional and of other kinds) characterizing mental life. He identifies nine basic operations: 1) attentional focalisation; 2) attentional movement; 3) evaluation of the attentional movement; 4) change of intensity of attentional focalisation; 5) maintenance of attentional focalisation for variable amounts of time; 6) attentional discarding; 7) memory; 8) representation; and 9) comparison. He conceives of this set of basic operations as an open one that can always be modified, enriched and improved.

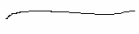
While I share most of what Benedetti sustains and the solutions he adopts, I have to point out that his otherwise very rigorous and noteworthy argumentation suffers on this last proposal from a methodological inaccuracy or oversight. I do not dispute at all his statement about the necessity to enlarge and further articulate the number and kinds of basic mental operations that were originally proposed by Ceccato and Vaccarino: indeed, I myself hold with this necessity (Marchetti, 2003). What I argue is that he does not describe and make explicit the steps necessary to identify the basic mental operations. Indeed, the inductive procedure on which he relies to identify them presupposes that, before being applied, one previously *defines* the criteria that allow tracing and finding what one is looking for. Indeed, how could one inductively find something if one does not already know

what to look for and find, and if one has not a criterion to find it? Only having first defined in what the thing looked for consists, what its function is, how it can be distinguished from other things, can one start searching for it. In this particular case, what Benedetti is looking for is the set of basic “mental operations”: that is, specific kinds of operations that have their own characteristics and that, as such, differ from other kinds of operations. Undoubtedly Benedetti applies some criterion: if he did not, he could not have identified precisely those nine basic mental operations. But he does not make it explicit, and in so doing, he makes a methodological mistake: that of not declaring all the steps necessary to get to a certain result. This mistake entails at least two consequences. The first and most obvious consequence is that of giving rise to the criticism that its procedure is not a scientific one, that is, one that can be submitted to intersubjective evaluation. The second consequence is that of overlooking some possible different or additional results that could be achieved if the procedure was applied in a rigorous and unambiguous way.

A positive definition of mental activity, distinguishing it from the other kinds of activities, has been formulated within the operative paradigm (see, for instance, Marchetti, 1993): mental activity is that activity whose products last only as long as the activity lasts, and coincide with it. As opposed to, for instance, physical products, which continue to exist even after the activity responsible for their production is over (think of a burning tree: once the physical activity of burning is finished, its product, that is, the ashes, remains), a mental product disappears as soon as the activity responsible for its production is over (once the activity of thinking about a burning tree is over, its product, that is, the thought of a burning tree, disappears as well). This definition unavoidably leads to conceive of attention as the core mechanism that makes the existence of mental activity possible: something can be present in our mind, either as a perception, a thought, an idea, a memory or whatever, only as long as we give attention to it. As soon as we turn our attention to something else, the previous thing will no longer occupy our conscious mind, and will be replaced by the new thing. One can certainly dispute this definition; nonetheless, it is precisely such a kind of definition that allows one to undertake the work of identification of basic mental operations.

In my opinion, this same methodological inaccuracy leads Benedetti to inappropriately generalize the conclusions he draws from his criticism of Ceccato’s and Vaccarino’s position on perception. As we have seen, Benedetti holds that perception is not, and must not be mistaken for, mental activity. Certainly, perceiving involves something that is not involved in mental activity: indeed, through the somatosensory system and the sense-organs we can experience things that we could not experience if we had to rely only on mental activity. However, when one reflects on what mental activity consists of, and how it functions, one sees that there cannot be perception without

mental activity: what we are visually or auditorily perceiving now disappears as soon as we turn our attention to something else. Perception is intrinsically related to mental activity.

Moreover, attention, and hence mental activity, plays an important role in perception also in another sense. It is certainly true, as Benedetti highlights, that most of our mental world is built up by means of the raw material supplied by perception, and that without sensible experience no pure mental categories could exist either. However, it is also true that without any specific activity of attentional focalisation, differentiation, discarding, comparison, integration, and so on, we could not perceive things, objects, and events as we currently and commonly do. If the entire job depended only on the sense-organs or the somatosensory system, there could be only two alternatives. In the first one, we would perceive nothing more than unrelated, meaningless fragments of sounds, colours, and sensations, forming no definite, distinct object or event. In the second one, supposing that we have an innate capacity to identify objects or events (as moreover the empirical evidence would seem to suggest: see, for instance, Soja, Carey and Spelke, 1991) and that the sense organs and the somatosensory system serve primarily to satisfy this capacity, we would not be able to perceive the same object or event in different ways: a certain object would be seen only in a certain way, and of a certain object we would see only certain characteristics. The possibility we have of perceiving many aspects of the same object (of a cat, for instance, we can perceive the tail, the nose, the mouth, the whiskers, and so on), or of perceiving an object in different ways (we can see, for instance, the following  either as a “line”, a “streak”, a “scratch”, or a “cut”) can be explained only if we resort to the concept of a mechanism – such as attention - able to stop at will the automatism of the sense-organs and the somatosensory system, and to pilot these latter according to the subject’s intentions, expectations, goals, etc. Therefore, I think that Benedetti’s correct and accurate remarks on Ceccato’s and Vaccarino’s analyses of perception have to be properly adjusted in order to also take these observations into account.

These few critical comments on Benedetti’s work, however, are in no way intended to, and actually could not, detract from its merits and achievements. In the context of the operative studies, this is the first methodology handbook to appear: it addresses the main topics of the operative paradigm; it gives precise suggestions on how to carry out the research; it warns about the main difficulties of the research; it proposes analytical techniques. In my opinion, this is also the first book that thoroughly investigates, analyzes and unmasks the difficulties implied by the operative technique. The way this work makes the reader reflect on the problems of operative research, and adopt as many theoretical and methodological constraints as possible certainly make it the indispensable guide to safely embark on this kind of study.

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