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Structural phenomenology: A reading of the early Husserl

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Abstract:
The aim of this paper is to show that Edmund Husserl's *Logical Investigations* should be regarded as one of the fundamental sources of structuralism. Husserl's version of structuralism is, however, quite original in many respects. Indeed, what Husserl advocates in his works can be defined, following and expanding a line of research inaugurated by scholars like Elmar Holenstein and Giovanni Piana (see Holenstein, E. 1975. *Roman Jakobsons phänomenologischer Strukturalismus*. Frankfurt: Suhrkamp, Holenstein, E. 1976. *Linguistik, Semiotik, Hermeneutik: Plädoyers für eine strukturale Phänomenologie*. Frankfurt: Suhrkamp, Holenstein, E. In publication. *Phenomenological Phenomenology of Language: Scattered Papers*. Geneva: sdvig, Piana, G. 2013a. L'idea di uno strutturalismo fenomenologico. In G. Piana (ed.), *Strutturalismo fenomenologico e psicologia della forma*, 5–17. http://www.lulu.com/shop/giovanni-piana/strutturalismo-fenomenologico-e-psicologia-della-forma/paperback/product-21332317.html (accessed 20 February 2018), Piana, G. 2013b. Momento figurale e qualità ghestaltica. In G. Piana (ed.), *Strutturalismo fenomenologico e psicologia della forma*, 101–119. http://www.lulu.com/shop/giovanni-piana/strutturalismo-fenomenologico-e-psicologia-della-forma/paperback/product-21332317.html accessed 20 February 2018), in terms of *phenomenological structuralism* or of *structural phenomenology*.

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1 Introduction

[1]In order to prove the general claim of the paper — namely that the philosophy of the early Husserl as exposed in *Logical Investigations* can be fully considered as part of a radical epistemological rupture that took place in Europe at the turn of the Twentieth century, that is, structuralism considered as a scientific paradigm[2] — I will try to disclose some of the core issues underpinning the philosophical project that shapes the *Logical Investigations* and then briefly compare it with some of the most radical instances of structuralism, namely the philosophy of mathematics established by the so-called "Bourbaki group" and the structural linguistics developed by Louis Hjelmslev and Noam Chomsky,[3] among others. As the paper intends to show, Husserl's early philosophical work turns out to be not a mere passive component of this epistemological rupture but rather represents a veritable catalyst thereof.

More specifically, the paper will first present Husserl's handling of the ideas of axiomatics and generativity within his theory of manifolds (*Mannigfaltigkeitslehre*). In this way, I will suggest that Husserl anticipates some of the basic insights of mature mathematical structuralism, especially as exposed in the work of the so-called "Bourbaki school."

Husserl's reflections are also relevant to linguistic structuralism. As Peer Bundgaard resolutely observes, "It is hardly exaggerated to claim that *Fourth Investigation* provided the tools and the categorical prerequisites for the systematic development, if not simply the birth, of structural linguistics, and thus linguistics in the modem sense *tout court*" (2004: 50). Secondly, the paper will show that some of the basic features of the general linguistic theories developed by Louis Hjelmslev and Noam Chomsky are very similar to Husserl's inquiries in the *Third* and *Fourth Investigation*, although the two linguists seemed to neglect Husserl's contribution. On the contrary, Roman Jakobson was the linguist who more explicitly brought the claims of early phenomenology — and above all of *Logical Investigations* — into the field of structural linguistics, so much so that the Russian linguist can be considered as "the most important and influential mediator of Husserl's phenomenology in the new linguistics" (Holenstein 2005: 11).[4] More in detail, "what Jakobson adopted were [...] principally the *Third Investigation* [...] and the application of the relationships secured from it to linguistic data in the *Fourth Investigation*." As a matter of fact, "in the *Third Investigation* Jakobson sees what one can designate [...] as the *considerations fundamental to structuralism*" (Holenstein 2005: 13).

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2 Structuralism: A definition

In this section, I will present a possible definition of structuralism as a general scientific paradigm following on the incisive remarks made by Ernst Cassirer in his famous 1945 paper, *Structuralism in Modern Linguistics*. Indeed, the German philosopher was among the first to consider structuralism as a general scientific framework and to describe it as a fundamental theory of the part-whole relation.

The term "structuralism" usually refers to a well-defined research trend in the area of the social sciences, especially popular in French culture during the 1950s and 1960s, whose "pilot science" — to borrow an expression from Dosse (1997) — was represented by Saussurian linguistics and, above all, the structural linguistics developed in the first half of the century by the schools of Moscow, Prague, and Copenhagen.[5] However, as Cassirer had observed in his 1945 paper, the history of structuralism begins much earlier and is not at all limited to the field of linguistics and social sciences and still less to a particular period of the French culture (for recent developments of this line of research, cf. De Palo, 2016; Flack, 2018). On the contrary, structuralism constitutes a proper scientific *paradigm* (see also Bastide, 1962; Piaget, 1970).

"Structuralism," as Cassirer observes, "is no isolated phenomenon; it is, rather, the expression of a *general tendency of thought* that [...] has become more and more prominent in almost all fields of scientific research" (1945: 120).[6] About twenty years later, in 1966, Michel Foucault likewise highlights the general and historical significance of structuralism, understood as an epistemological rupture, by claiming that "Structuralism is not a new method; it is the awakened and troubled consciousness of modern thought" (Foucault 2002: 226).

Structuralism can then be seen as a coherent, unitary, and integrated scientific endeavour that emerges in opposition to the scientific framework typical of the nineteenth century, according to which only those explanations which are causal and historical-genetic are truly scientific (cf. Holenstein 1976).

More specifically, "a structuralist perspective," Roman Frigg and Ioannis Votsis write, "is one that sees the investigation of the structural features of a domain of interest as the primary goal of enquiry." "This vision," they write further, "has shaped research programmes in fields as diverse as linguistics, literary criticism, aesthetics, sociology, anthropology, psychology, and various branches of philosophy" (2011: 227).

In other words, a structuralist approach seeks to identify and describe the specific structures embedded in a disciplinary domain. To provide a univocal and rigorous definition of the concept of structure is not an easy task, though (see Boudon, 1971; Broekman, 1974; Lepschy, 1981).

What is crucial in Cassirer's account of structuralism is exactly the attempt to provide a description of the concept of structure in terms of part-whole relation. As is well known, Cassirer does so by establishing a parallel between linguistics and biology by means of a strong reference to Cuvier's work.

Cassirer quotes a long passage from Cuvier's *Discours sur le révolutions de la surface du globe:*

> Heureusement l'anatomie comparée possède un principe, qui, bien développé, est capable de faire évanouir tous les embarras: c'est celui de la corrélation des formes dans les êtres organisés, au moyen duquel chaque sorte d'être pourrait, à la rigueur, être connue par chaque fragment de chacune de ses parties. Tout être organisé forme un ensemble, un système unique et clos, dont les parties se correspondent mutuellement, et concourent à la même action définitive par une réaction réciproque. Aucune de ces parties ne peut changer sans que les autres changent aussi; et par conséquent chacune d'elles prise séparément, indique et donne toutes les autres[...] (Cassirer 1945: 107)
>
> [Fortunately, comparative anatomy, when thoroughly understood, enables us to surmount all these difficulties, as a careful application of its principles instructs us in the correspondence and dissimilarity of the forms of organized bodies of different kinds, by which each may be rigorously ascertained, from almost every fragment of its various parts and organs. Every organized individual forms an entire system of its own, all the parts of which mutually correspond, and concur to produce a certain definite purpose, by reciprocal reaction, or by combining towards the same end. Hence none of these separate parts can change their forms without a corresponding change on the other parts of the same animal, and consequently each of these parts taken separately, indicates all the other parts to which it has belonged.][7]

Cassirer comments on this extract as follows:

> "I have quoted this passage at some length, for, I think, we may use it for making a very interesting mental experiment, we may exchange every biological term of Cuvier for a linguistic term. In this case we should have, before our very eyes, the program of modern linguistic structuralism" (1945: 107).

The general claim of the present paper is exactly that Husserl's *Fourth Investigation* accomplishes the task that Cassirer proposes as a mental experiment; in other words, Husserl's *Fourth Investigation* can be considered as an analysis of language based on part-whole relation, namely on the mereological framework developed in *Third*

Investigation. As such, Husserl's analyses can be seen as a prefiguration of the program of modern (linguistic) structuralism.

Before turning to Husserl's *Logical Investigations*, I think it is useful, following this line of inquiry, to provide an operative definition of "structure" by means of a combination of two "standard definitions" advanced, some years later, by Roger Bastide and Jean Piaget.

Bastide defines the concept of structure in the following way:

> 1) a bound system, such that the change made to an element implies a change in the other elements; 2) this system (and this is precisely what distinguishes it from a mere organisation) is latent in the objects — hence the expression 'model' used by the structuralists — and it is precisely because it is a model that it allows predictability and makes the observed facts intelligible; 3) models are 'local' — not only in the sense that they vary depending on the disciplines — but also that every discipline may have to use variable models; 4) the concept of structure is a 'synchronic' concept. (1962: 13, my translation)

Some years later, Piaget writes that:

> A structure is a system of transformations. Inasmuch as it is a system and not a mere collection of elements and their properties, these transformations involve laws: the structure is preserved or enriched by the interplay of its transformation laws, which never yields results external to the system nor employ elements that are external to it. In short, the notion of structure is comprised of three key ideas: the idea of wholeness, the idea of transformation, and the idea of self-regulation. (1970: 5)

According to these definitions, a structure can be described as a *totality* — in other words, as a system of elements that are dependent on the complexes into which they enter (in the domain of natural numbers, for instance, "2" has an arithmetical meaning only within the complex of the natural numbers); these elements are governed by a set of *transformation rules* that determine the range of all possible combinations between its elements (for instance, the rules of addition: $1 + 2 = 3$, $1 + 4 = 5$); moreover, a structure is auto-regulative. This means that the *transformation rules* of a structure, that is the rules defining the possible combinations among the elements composing the structure, cannot yield elements that do not belong to the domain of the structure itself (the result of an addition between natural numbers is a natural number). Furthermore, elements produced through the *transformation rules* preserve these same rules and are subject to them (the result of an addition between natural numbers is a natural number and, as such, is ruled by the same laws governing all natural numbers). Finally, a structure must always be able to be interpreted in terms of a model, namely of a formal description that makes it possible to outline and predict the relations that subsist among the elements composing the structure itself (for instance, $a - a = 0$, where a stands for any natural number whatsoever).

3 Theory of science and pure theory of manifolds

In order to better understand the philosophical meaning of the *Third* and *Fourth Investigation* and to assess their importance for the argument of this paper, in this section I will try to give an outline of the epistemological kernel of *Logical Investigations* that Husserl discloses in the first volume of his work, namely *Prolegomena to a Pure Logic*.

In the preface of the first edition of *Logical Investigations*, Husserl claims that in this text he will focus on "discussions of a very general sort" that stretch far beyond "the narrow sphere of mathematics" — which Husserl had dealt with in his first philosophical work, namely *Philosophy of Arithmetic* — and that aspire to "a universal theory of formal deductive systems" (2001a: 1). In other words, the aim of *Logical Investigations* consists in seeking to bring to light the formal structure of knowledge, namely the set of all those laws that are common to every possible form of knowledge and, especially, of scientific knowledge. These laws represent therefore the conditions of possibility of each and every specific science or, to put it differently, "the conditions of possibility of the already-made-world with its regional ontologies" (Petrilli 2012: 45). The enquiries conducted in *Logical Investigations* concern therefore "all sciences equally, since they concern, in brief, whatever makes sciences into sciences" (Husserl 2001a: 16). "The outcome of our investigation of this point," Husserl maintains, "will be the delineation of a new, purely theoretical science, the all-important foundation for any technology of scientific knowledge, and itself having the character of an *a priori*, purely demonstrative science" (ibid.: 14).

Husserl names this "new, purely theoretical science," *Wissenschaftslehre*, "theory of science." This theory, as Husserl writes, sets out to be something like a "theory of theory" or a "science of science."

The *Wissenschaftslehre* can thus be defined as an *axiomatics* of science, that is as a set of fundamental, self-evident, and universal laws that every particular science must follow and from which all specific scientific statements can be obtained. Thus, the theory of science must develop into what Husserl calls a "pure theory of

manifolds" (*reine Mannigfaltigkeitslehre*). Indeed, the theory of science must complete the search for the conditions of possibility of science as such — namely, the observance of a definite set of elementary and universal laws that are, basically, the laws defined by formal logic — with the deduction of "all *possible theories* in *a priori* fashion" (ibid.: 155). In other words, according to Husserl, "it is possible to construct," or to generate, "out of purely categorial concepts, many definite concepts of possible theories or pure 'forms' of theories" (ibid.: 155), which Husserl calls, with a term taken from mathematics, "manifolds." In this sense, Husserl can be said to sharpen the *generative* and *deductive* element typically embedded in every axiomatic system.

In fact, according to Husserl, once we have identified all the categorial concepts — for instance, "truth," "proposition," "concept," "object," "unity," "relation" — and all the universal laws that define the set of their mutual relations and represent the conditions of possibility of the concept of theory in general, we should be able to deduce, in *a priori* fashion, all the possible specific forms of theory, that is all the possible relations concerning a specific class of objects, for example numbers or phonemes. The theory of numbers, for instance, represents the formal theory of the class of objects represented by numbers, phonology the formal theory of the class of objects represented by phonemes. Once we have specified a subclass of objects, theories can then generate new and "less" fundamental formal theories, for instance the formal theory of cardinal numbers, of real numbers, of complex numbers etc. In other words, according to Husserl's axiomatic theory of knowledge, if we change the class of objects to be considered, we can generate different theories, which are anyway always deducible in *a priori* fashion out of the universal laws upon which, as scientific theories, they are necessarily grounded. A pure theory of manifolds should therefore lead to something like a categorial combinatorial analysis able to define, in *a priori* fashion, all the possible theories generated by every possible variation of the class of objects considered.

4 Bourbaki's structuralism as a realization of Husserl's theory of manifold

In this section, I will take into account the epistemological kernel of Bourbaki's philosophy of mathematics in order to show, on the one hand, how it is consistent with the axiomatic approach proposed by Husserl in *Prolegomena* and, on the other, how their idea of structure is very similar to the one proposed in the first section of this paper and, as I will show, to Husserl's notion of whole, as developed in *Third Investigation*.

The general idea underpinning the structuralist program developed by the so-called "Bourbaki group" is to reduce the whole of mathematics to the idea of structure.[8] As C. B. Boyer observes,

> "mathematics of the twentieth century has seen an emphasis on abstraction and an increasing concern with the analysis of broad patterns. Perhaps nowhere is this more clearly apparent than in the mid-twentieth-century works emanated from the polycephalic mathematician known as Nicolas Bourbaki" (1991: 629).

In a fundamental essay published in 1948, *The Architecture of Mathematics*, Bourbaki proposes the following definition of the notion of *structure*:

> The common character of the different concepts designated by this generic name, is that they can be applied to sets of elements whose nature has not been specified; to define a structure, one takes as given one or several relations, into which these elements enter [...] To set up the axiomatic theory of a given structure, amounts to the deduction of the logical consequences of the axioms of the structure, excluding every other hypothesis on the elements under consideration (in particular every hypothesis as to their own nature). (1950: 225–226)

A structure is thus defined as a set of fully undetermined elements, among which one or more relations obtain, which are ruled by a class of laws called axioms. The axiomatic theory of a structure must allow the deduction of all the logical consequences implied by the axioms — that is, the totality of combinatorial possibilities that obtain among the elements that compose the structure — regardless of their material nature. The elements of a structure are thus determined solely by the kind of relation in which they are inserted. In other words, they can only receive a formal definition and not a material one.

According to Bourbaki, every mathematical element can then be described in structural terms, namely as an element of a mathematical structure, as part of a structural relation. There exist different kinds of relation, which can be grouped in three big classes that give life to what Bourbaki calls *mother-structures*. These are the fundamental structures, from which all the other mathematical structures must be generated and from which the entire "architecture of mathematics" — from algebra to the theory of numbers, from analysis to geometry to probability calculus — can be deduced. The mother-structures are, according to Bourbaki, the "algebraic structures," which are defined by composition relations (for instance, addition or multiplication of

real numbers); the "order-structures," which are defined by order relations (for instance, *x* follows *y*); and finally "topological structures," which are defined by relations of proximity, continuity, or limit. All other possible mathematical structures are deducible from the mother-structures either *via* combination — by simultaneously submitting a class of elements to two structures — or *via* differentiation — by posing restricting axioms that define a substructure.

Against this background, I believe that it is possible to claim that, Bourbaki's conception of mathematics is very similar to Husserl's theory of manifold. Indeed, as Rosado Haddock (2006: 213) writes, "the mother structures play in Bourbaki's conception the same role played in Husserl's by the most general structures based on the formal ontological categories."

According to Haddock, then, Husserl anticipates "future developments in mathematics, namely, the possibility of combining different but compatible mathematical structures to obtain a complex mathematical manifold" (ibid.: 208) — in other words, the very gist of Bourbaki's philosophy of mathematics.

5 The third logical investigation: An outline of a formal ontology

In this section, I will focus on Husserl's *Third Investigation*, since it is here that Husserl introduces his notion of whole that, as this paper aims to show, can be seen as a forerunner of the structuralist notion of structure as defined in the second section of this paper.

In *Third Investigation*, Husserl devotes himself to a fundamental, formal study of the possible relations that can obtain, in *a priori* fashion, among objects. In "The ontology of *Logical Investigations*," Barry Smith and David Woodrow Smith write,

> is of interest first of all because of its clear conception of a *formal* discipline of ontology analogous to formal logic [...] Formal disciplines are set apart from "regional" or "material" disciplines in that they apply to all domains of objects whatsoever, so that they are independent of the peculiarities of any given field of knowledge [...] (1995: 28)

Objects are thus considered independently from their belonging to a particular class or domain. Indeed, as Husserl writes at the beginning of the *Third Investigation*, "the term 'object' is in this context always taken in its widest sense" (2001b: 5). In fact, this term does not designate only spatio-temporally determined things; rather, it identifies, in the most general way, a possible, that is, non-contradictory, content of representation.

"Objects," Husserl claims at the beginning of *Third Investigation*, "can be related to one another as Wholes to Parts, they can also be related to one another as coordinated parts of a whole" (ibid.: 4). An object, in the widest sense of the term, is either a whole containing other objects as its parts or a part coordinated with other parts with which it composes a whole. "Every object is either actually or possibly a part, i.e., there are actual or possible wholes that include it" (ibid.: 4) can be considered as the first axiom of Husserl's formal ontology.

He then distinguishes between two fundamental kinds of relations that can obtain among two or more objects, namely independence and non-independence. "A content," or an object, "*A* is relatively non-independent in regard to a content *B* (or in regard to the total range of contents determined by *B* and all its parts)," Husserl writes,

> if a pure law, rooted in the peculiar character of the kinds of content in question, ensures that a content of the pure Genus *A* has an a priori incapacity to exist except in, or as associated with, other contents from the total ranges of the pure Genera of contents determined by *B*. If such a law is absent, we say that *A* is relatively independent in regard to *B*. (Ibid.: 22–23)[9]

If an object *A* is *a priori* connected to another object *B* according to a law of necessary implication — that is to say, in Husserl's wording, according to a relation of foundation — *A* is relatively non-independent in regard to *B* (for instance, the number *2* is relatively non-independent in regard to the number *3*); if instead the connection between an object *A* and another object *B* is arbitrary and accidental, *A* is then relatively independent in regard to *B* (for instance, a pencil is relatively independent in regard to the table on which it rests). The term "necessity," however, must not be understood as indicating a "subjective incapacity-to-represent-things-otherwise," but rather as "the objectively ideal necessity of an inability-to-be-otherwise" (ibid.: 12). The kind of necessity that comes into play in the definition of independent and non-independent relations is thus ontological and not merely psychological. "What prevents its being otherwise is," in the case of a non-independent object,

> "the law which says that it is not merely so here and now, but universally so, and with a lawful universality. Here we must note that [...] the 'necessity' relevant to our discussion of non-independent 'moments' stands for an ideal or a priori necessity" (ibid.: 12).

"The necessity of supplementing non-independent parts," Drummond (2003: 60) remarks, "with other parts arises out of a necessity in the nature of the things themselves, a necessity in the sense of the parts themselves." "The necessity of blending these different parts," Sokolowski (1977: 96) observes,

> is not due to any psychological disposition in me or in my culture, but is grounded in the sense of the parts [...] Each part, by virtue of what it is, contains within itself a *rule* dictating the necessary progression of supplements that it must possess.

Husserl then goes into more details with the analysis of relations and, especially, of foundation, namely necessary implication. "If we consider any pair of parts of a whole," Husserl writes,

> "the following possibilities obtain: 1. There is a relation of foundedness between both parts. 2. There is no such relation. In case 1 the foundedness can be: *(a)* reciprocal [gegenseitig] *(b)* one-sided [einseitig], according as the law in question is convertible or not" (2001b, p. 27).

A foundation is one-sided when the existence of a part *A* implies the existence of a part *B*, without this meaning that the existence of *B* implies the existence of *A*: in this case *A* is independent from *B*, whereas *B* is non-independent from *A*. On the other hand, a foundation is reciprocal if the existence of a part *A* implies the existence of a part *B* and the existence of *B* implies the existence of *A*. In this case, *A* and *B* are mutually non-independent.

Against this background, Husserl then distinguishes between two different kinds of sets of objects, namely aggregates and wholes. Aggregates are mere sums of independent objects that stand together accidentally, that is without implying a relation of foundation — whereas Husserl understands wholes to be a set of non-independent objects that are unified by a foundational relation, that is to say with Husserl's words,

> "a range of contents which are all covered *by a single foundation* without the help of further contents. The contents of such a range we call its parts. Talk of the *singleness of the foundation* implies that *every content is foundationally connected, whether directly or indirectly, with every content*" (ibid.: 34).

A whole is thus a set of objects among which subsists a foundational relation, that is to say a relation of necessary implication. Typical examples of a whole in this sense are live organisms, in which each part depends on the existence of the others, according to a system of dependencies which varies from species to species: as human beings — for instance, we could not have a brain without a nervous system, nor a heart without lungs or kidneys, etc.

The notion of "whole" (*Ganzen*) proposed by Husserl is thus perfectly comparable to the structuralist notion of "structure" as presented in Section 2 of this paper. In fact, 1) a whole is a totality, since it is as a system of elements that are dependent of the complexes into which they enter; 2) a whole has *transformation rules* that determine the range of all possible combinations between its elements, namely the laws governing the relations of independence and non-independence; 3) a whole is auto-regulative, since the relations that obtain among its elements derive directly and necessarily from the nature of the elements themselves; 4) finally, a whole can always be described in terms of a model, namely of a formal description, as we can see from Husserl's formal ontology.[10]

After all, as Göran Sonesson has noted, "structure has to be studied within a more complete mereological framework, that is, within the science of parts and their relation to the whole, first defined by Twardowski and Husserl" (2012: 84).[11]

6 Pure grammar and structural linguistics

In *Fourth Investigation*, Husserl applies the mereological framework developed in *Third Investigation* to a very special domain of objects, namely to expressions, which are defined as linguistic signs which bear a meaning, that is a reference to a class of objects. This is crucial for the argument of this paper, since *Fourth Investigation* represents the text in which Husserl develops for the most part his linguistic insights and, accordingly, can be regarded as the text that shows in the clearest way the "intellectually passionate affinity" (Bundgaard 2004: 51) with one of the main expressions of structuralism, namely structural linguistics.

As we shall see, if in *Third Investigation* Husserl had set forth the outlines of a formal ontology, in *Fourth Investigation* he focuses on some essential conceptual distinctions that define the fundamentals features of what we could call a "formal semantics," namely a study of the ideal form of meanings, as well as of a "formal syntax," namely a study of the a priori laws which determine the set of possible combinations between meanings. As E. W. Orth observes,

> "on the level of logical and epistemological reflection [...] language has become important in a twofold respect: once as a system of 'meanings' and [...] as a so-called 'pure logical grammar.' The one could be called Husserl's contribution to semantics, the other his contribution to syntax" (1973: 342).

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Like every kind of objects, linguistic objects, namely expressions, are also either independent — in this case, they bear an independent meaning — or non-independent — in this case, they bear a non-independent meaning. Since in *Fourth Investigation* Husserl is primarily interested in the possible relations between expressions and therefore between meanings, he mainly focuses his attention on sets of expressions, namely on what he calls complex expressions like, for instance, the sentence "a king who wins the love of his subjects." Following the terminology proposed by the philosopher and linguist Anton Marty, who in turn draws on a medieval distinction, Husserl then distinguishes between what he calls syncategorematic expressions such as, in the exemplifying sentence, "a," "who," "the," "of," "his," and categorematic expressions such as, in this case, "king," "wins," "love," "subjects."

Syncategorematica are, according to Husserl, who quotes directly from Marty, "signs 'which only have complete significance together with other parts of speech,'" while categorematica are "independently significant or complete expressions" (Husserl 2001b: 54) In fact, the syncategorematic expression "who" has no meaning outside the complex expression in which it occurs, while the categorematic expression "king" maintains its meaning even if isolated from the broader expression in which it occurs. Thus, meanings borne by syncategorematic expressions are always non-independent while meanings borne by categorematic expressions are always independent. This means that non-independent meanings are, following the terminology introduced by Husserl in *Third Investigation*, always founded in other meanings, that is to say that they necessarily imply other meanings in order to be, in turn, meaningful themselves. In other words, "*categorematica* are semantic pieces of a linguistic whole," that is independent parts, "*syncategorematica* are semantic moments of a linguistic whole" (Bundgaard 2004: 56), that is non-independent parts. Indeed, while the isolated expression "king" can be said to have a complete meaning for itself, the isolated expression "who" has no meaning unless connected with other expressions as, for instance, in the sentence "the king, who ... " Of course, this does not mean that *syncategorematica* have no meaning: "they have a signification in their own right, yet their signification is not a complete or independent one, but an incomplete and dependent one" (ibid.: 56). However, according, to Husserl every "grammatical distinction is an expression of an essential semantic distinction" (ibid.: 56), since "if the verbal resources of language," that is expressions, "are to be a faithful mirror of all meanings possible a priori, then language must have grammatical forms at its disposal which give distinct expression, i.e., sensibly distinct symbolization, to all distinguishable meaning-forms" (Husserl 2001b: 55). Independent and non-independent expressions must therefore have as their counterparts independent and non-independent meanings. Accordingly, *syncategorematica* have as their meanings non-independent meanings, while *categorematica* have as their meanings independent meanings. "A meaning, accordingly, may be called 'independent,'" Husserl writes, "when it can constitute the full, entire meaning of a concrete act of meaning," as in the case of a categorematic expression like "tree," where the reference to a specific class of objects, in this case the class of woody perennial plants, typically having a single stem or trunk growing to a considerable height and bearing lateral branches at some distance from the ground; on the other hand, a meaning is

> "'non-independent' when this is not the case. It can then only be realized in a non-independent part-act in a concrete act of meaning, it can only achieve concreteness in relation to certain other complementary meanings, it can only exist in a meaningful whole [Bedeutungsganzen]" (ibid.: 59).

"To each case of non-independent meaning," Husserl then writes, "a law of essence applies [...] a law regulating the meaning's need of completion by further meanings, and so pointing to the forms and kinds of context into which it must be fitted" (ibid.: 54). The general point, Bundgaard remarks,

> is simply that in each material sphere (or generic family) of objects, we will find rules proper to that sphere, which govern the connection of the kind of parts we find in that sphere. In the sphere of, say, intuition, we will for example find determinate dependence relations between color and extension; thus, in the sphere of meaning, we must expect to find a priori rules that specifically govern the combination of linguistic elements. (2004: 62)

The study and identification of these laws of essence concerning the possible combinations of expressions within language is exactly the concern of what Husserl calls "pure grammar." Indeed, according to Husserl, "in the realm of meaning there are a priori laws allowing meanings to be transformed into new meanings while preserving an essential kernel" (2001b: 54). Take, for instance, the complex expression "the tree is green." Of course, one can vary the form of this expression in many different ways producing new expressions like "the tree is beautiful," "the kid is green," or "the green is beautiful," but not every variation actually turns out to be

possible. Indeed, expressions like "the kid is the," "the green is or," or "the or is the" cannot be considered as possible combinations. According to Husserl, the impossibility of these combinations

> rests on a law of essence, *and is by no means merely subjective*. It is not our mere factual incapacity, the compulsion of our 'mental make-up,' which puts it beyond us to realize such a unity. In the case we here have in mind, the impossibility is rather *objective*, ideal, rooted in the pure essence of the meaning-realm, to be grasped, therefore, with apodictic self-evidence. (Ibid.: 62, my italics)

What Husserl means is that the kind of possibility and impossibility involved in the considered combinations of expressions does not limit itself to a specific empirical language or to a particular individual psychological speaker but rather concerns universal foundational laws which determine the semantic and syntactic structure of language as such.

The structuralist framework that, in my view, shapes *Logical Investigations* becomes thus particularly apparent if one considers structuralism in its linguistic formulation, namely structural linguistics and, more specifically, as we shall see, Hjelmslev's theory of language.[13]

Indeed, although it is true that there seems to be no direct contact between Saussure's and Husserl's works, it is on the other hand true that there are many similarities at both historical and theoretical levels between Husserl's early philosophy and the scientific activity of Roman Jakobson as well as, more generally, of the other members of the Prague linguistic circle, founded in 1926 by the Czech linguist Vilem Mathesius and considered, together with the Copenhagen school, the place in which structural linguistics took its most rigorous form.

Also, on the Danish side of structural linguistics, the influence of Husserl is, although less evident, certainly significant. If in *Logical Investigations* Husserl defines his analyses as concerning "all sciences equally, since they concern, in brief, whatever makes sciences into sciences" (2001a: 16), in his 1943 *Prolegomena to a Theory of Language*, Louis Hjelmslev (1969: 8) analogously writes that a "linguistic theory […] must seek a *constancy*, which is not anchored in some 'reality' outside language — a constancy that makes language a language, whatever language it may be." Hjelmslev describes the fundamental idea underpinning a theory of language in a passage situated in the final pages of *Prolegomena*, which shows a deep affinity with Husserl's axiomatics and with his formal-mereological approach to the study of language.

> The theoretician's main task is to determine by definition the structural principle of language, from which can deduce a general calculus in the form of a typology whose categories are the individual languages, or rather, the individual language types. All possibilities must here be foreseen, including those that are virtual in the world of experience, or remain without a "natural" or "actual" manifestation. In this general calculus there is no question of whether the individual structural types are manifested, but only whether they are manifestable and, *nota bene*, manifestable in any substance whatsoever. (Ibid.: 106)

If we compare the passage from Hjelmslev (ibid.) with some extracts from *Fourth Logical Investigation*, the terminological and, especially, theoretical affinity is just striking:

> The foundations of speech are not only to be found in physiology, psychology and the history of culture, but also in the *a priori* […] [The field of *a priori*] deals with the essential meaning-forms and their *a priori* laws of compounding or modification, and no speech is conceivable that is not in part essentially determined by this *a priori*. We may finally say: within pure logic one must separate off what, considered in itself, forms a first, basic sphere, the pure theory of meaning-forms. Considered from the standpoint of grammar, it must lay bare an ideal framework which each actual language will fill up and clothe differently, in deference either to common human motives or to empirical motives that vary at random. To whatever extent the actual content and grammatical forms of historical languages are thus empirically determined, each is bound to this ideal framework. (Husserl 2001b: 74)

In the second edition of 1913, Husserl adds further:

> One must have this in mind in order to be able to ask significantly: How does German, Latin, Chinese etc., express 'the' existential proposition, 'the' categorical proposition, 'the' antecedent of a hypothetical, 'the' plural, 'the' modalities of possibility and probability, 'the' negative etc? It is no matter of indifference whether the grammarian is content with a prescientific personal opinion on meaning-forms, or with notions empirically contaminated by historical, e.g. by Latin grammar, or whether he keeps his eyes on a scientifically fixed, theoretically coherent system of pure meaning-forms, i.e. on our own form-theory of meanings. (Ibid.: 74)

Moreover, Hjelmslev provides a mereological definition of the notion of structure based on dependency relations:

> The mutual dependences, in which the one term presupposes the other and *vice versa*, we shall call conventionally interdependences. The unilateral dependences, in which the one term presupposes the other but not *vice versa*, we call *determinations*. And the freer dependences, in which two terms are compatible but neither presupposes the other, we call *constellations*.

The three kinds of *dependence* identified by Hjelmslev in *Prolegoma to a Theory of Language* are closely connected to the relations of foundation distinguished by Husserl in *Third Logical Investigation*, namely reciprocal and one-sided foundation. As Stjernfelt (2007: 168) observes,

> it is striking that Hjelmslev here as the basis for his theory of languages takes three mereological types of dependencies very well known in Brentanist tradition. We find them in Brentano, for instance, and at a prominent place in the 3rd LU where [there is] the identical distinction between 'gegenseitige' [reciprocal], 'einseitige' [one-sided], and no relation, respectively.

In the ninth paragraph of *Prolegomena to a Theory of Language*, the mereological approach becomes all the more clear: "It soon becomes apparent," Hjelmslev (1969: 22–23) writes,

> that the important thing is not the division of an object into parts ["dele" in the Danish text, which is the literal translation of the German term "teil" used by Husserl], but the conduct of the analysis so that it conforms to the mutual dependences between these parts, and permits us to give an adequate account of them [...] Both the object under examination and its parts have existence only by virtue of these dependencies; the whole of the object under examination can be defined only by their sum total; and each of its parts can be defined only by the dependencies joining it to the other coordinated parts, to the whole, and to its parts of the next degree contact with each other.

As already noted by many scholars (Edie, 1977; Bonomi, 1987; Simons, 2001; Benoist, 2002; Münch, 2002; Bundgaard, 2004), Husserl's linguistic insights, although only sketched in *Fourth Investigation*, also represent an anticipation of Chomsky's idea of a generative grammar, at least with regards to the general concept of a pure grammar, which, according to Chomsky, should define "a system of rules that can iterate to generate an indefinitely large number of structures" (1965: 16).[14] Since this affinity has been largely acknowledged, I limit myself to quote a passage from *Syntactic Structures*, where the kinship between Chomsky's and Husserl's epistemological stances are particularly manifest. Indeed, Chomsky (2002: 11) writes that his aim lies in the construction of:

> a grammar that can be viewed as a device of some sort for producing the sentences of the language under analysis. More generally, linguists must be concerned with the problem of determining the fundamental underlying properties of successful grammars. The ultimate outcome of these investigations should be a theory of linguistic structure in which the descriptive devices utilized in particular grammars are presented and studied abstractly, with no specific reference to particular languages. One function of this theory is to provide a general method for selecting a grammar for each language, given a corpus of sentences of this language.

The main debts owed by structural linguistics towards Husserl's early phenomenology can be thus summed up in the following three points:

1. The mereological framework and the concept of whole.
2. The predilection of theoretical, axiomatic, a priori and formal approaches to the study of language.
3. The idea of a pure grammar and of a "combinatorics" of meanings and expressions.

7 Conclusion

With this paper, I have tried to show that the philosophy of the early Husserl — notably as exposed in *Logical Investigations* — should be fully considered as part of a radical epistemological rupture, which took place in Europe at the turn of the twentieth century, namely *Structuralism*. More specifically, drawing mainly on *Prolegomena to a Pure Logic*, *Third Investigation*, and *Fourth Investigation*, the paper has shown Husserl's handling of the ideas of *axiomatics* and *generativity* within his theory of science and theory of manifolds. By comparing Husserl's early project with some of the most radical structuralist instances within the field of mathematics and linguistics, I have argued that the generative axiomatics developed in *Logical Investigations* must be regarded as one of the first coherent instances of a structuralist framework and, accordingly, that *Logical Investigations*

must be counted among the fundamental sources of Structuralism, considered as an integrated and coherent scientific paradigm.

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Notes

1 This paper represents an autonomous, original, and substantial elaboration of material previously published in Aurora (Aurora 2015a; 2015b; 2016; 2017).
2 For a criticism of this line of thinking, cf. Swiggers (1981) and Albano Leoni (2015).
3 The legitimacy of considering Chomskyan linguistics as part of the structuralist tradition initiated by Saussure represents a debated issue, cf. Koerner (1976) and Matthews (2003). A presentation of Chomsky's generative grammar is included, for instance, in Lepschy (1970).
4 It is worth recalling that the first translation of *Logical Investigations* into a foreign language is the Russian translation of 1909; however, it includes only the first volume of the German edition, namely *Prolegomena to a Pure Logic*.
5 See, for instance, Dosse (1997), who defines structuralism as a "French intellectual chapter of the fifties and sixties" (ibid.: xxvi) and as "a time when linguistics was a pilot science guiding the steps of the social sciences as a whole toward scientificity." (ibid.: xx).
6 Some years before, the phonologist Nikolai Trubetzkoy had similarly observed: "L'époque où nous vivons est caracterisée par la tendance de toutes les disciplines scientifiques à remplacer l'atomisme par le structuralisme […] Cette tendance se laisse observer en physique, en chimie, en biologie, en psychologie, en science économique, etc. La phonologie actuelle n'est donc pas isolée. Elle fait partie d'un mouvement plus ample" (quoted in Bastide 1962: 36). [Nowadays every scientific discipline is characterised by the tendency to replace atomism with structuralism […] This tendency can be observed in physics, chemistry, biology, psychology, economic science, etc. In this respect, contemporary phonology is not isolated. It is part of a wider movement.]
7 English translation by Robert Kerry, cf. Cuvier (2009: 90).
8 "From the axiomatic point of view, mathematics appears thus as a storehouse of abstract forms — the mathematical structures" (Bourbaki 1950: 231).
9 According to *Third Investigation*, we can only talk of *relative* independence and non-independence. As Husserl indeed maintains, there cannot be objects that are *absolutely* independent to each other, namely that have no relation whatsoever with other objects, nor objects that are *absolutely* non-independent, namely that are connected with each and every object. Objects are always independent or non-independent in relation to other specific objects. Thus, an object *A* can be relatively non-independent in regard to *B* and, at the same time, relatively independent in regard to *C*.
10 For a more exhaustive attempt to formalize Husserl's theory of wholes and parts, cf. Simons (1982).
11 Cf. also Bastide (1962: 10): "M. L. Bernot remarque à ce propos que, dès ses débuts. 'le mot désigne à la fois a) un ensemble b) les parties de cet ensemble, c) les rapports de ces parties entre elles.'" [M. L. Bernot remarks in this regard that from its beginnings the term refers to: a) a group, b) the parts of this group, c) the relations between these parts.] See also Sturrock (2003: 21): "Structuralism is distinctive for studying its objects explicitly as wholes and the parts which make up those wholes as parts, that is, never purely intrinsically but in terms of the contribution they make to the whole they are part of."
12 It is worth recalling that the term "semantics" had been introduced in 1897, just a few years before the publication of Husserl's *Logical Investigations*, by the linguist Michel Brèal. Cf. Brèal (1899: 9), where he writes that with term "semantics" stands for the "science des significations […] par opposition à la *Phonétique*, la science de sons." [Science of signification […] in opposition to Phonetics, the science of sounds.]
13 For a more detailed analysis of the relationship between Husserl and Hjelmslev, cf. Galofaro (2006), Stjernfelt (2007), and Aurora (2016).
14 Cf. Benoist (2002: 96): "What is Husserl speaking about when he speaks of 'logical grammar?' It seems to be a kind of 'universal grammar,' as his mentioning the French grammarians of the seventeenth and eighteenth centuries […] might seem to indicate. This idea would still bring Husserl and Chomsky close together […] Husserl seems closer to Chomsky, in his structural and syntactical point of view […]. Though Chomsky did not explicitly appeal to Husserl, Jakobson did. Husserl played, therefore, a certain role in the birth of linguistic structuralism." See also Edie (1977: 150): "Husserl […] limits himself to giving a kind of outline of what a pure logical grammar would be if it were to be worked out within his general phenomenological architectonic of interrelated and properly subordinated 'sciences.' But this is sufficient to relate his project to the contemporary aprioristic approach to grammar adopted by Chomsky and his school," as well as Simons (2001: 54): "The *Fourth Investigation* is the shortest of the six but is one of Husserl's most prophetic pieces, partly because it anticipates ideas which did not emerge again until the 1960s and partly because it exercised a certain direct and indirect influence on developments in logical gramma through to our day."

References

Albano Leoni, F. 2015. Les Parties et le tout: Jakobson, Husserl et la phonologie. *Histoire, Êpistémologie, Langage* 37(1). 27–42.
Aurora, S. 2015a. Between realism and idealism: Transcendental experience and truth in Husserl's phenomenology. In D. Jørgensen, G. Chiurazzi & S. Tinning (eds.), *Truth and experience: Between phenomenology and hermeneutics*, 243–261. Newcastle: Cambridge Scholars Publishing.
Aurora, S. 2015b. A forgotten source in the history of linguistics: Husserl's logical investigations. *Bulletin d'Analyse Phénoménologique* XI(5). 1–19.
Aurora, S. 2016. Teoria del linguaggio e grammatica pura: Sulla presenza di Husserl ne *I fondamenti della teoria del linguaggio* di Hjelmslev. In L. Cigana (ed.), *Percorsi filosofici nella glossematica, Janus. Quaderni del circolo glossematico*, vol. XIV, 9–26. Treviso: Zel.
Aurora, S. 2017. *Filosofia e scienze nel primo Husserl: Per una interpretazione strutturalista delle* Ricerche logiche. Padova: Cleup.
Bastide, R. (ed). 1962. *Sens et usages du terme structure dans les sciences humaines et sociales*. The Hague: Mouton.

Benoist, J. 2002. The question of grammar in logical investigations, with special reference to Brentano, Marty, Bolzano, and later developments in logic. In A. T. Tymieniecka (ed.), *Phenomenology world-wide: foundations, expanding dynamics, life-engagements: A guide for research and study*, 94–98. Dordrecht: Kluwer.
Bonomi, A. 1987. *Le immagini dei nomi*. Milano: Garzanti.
Boudon, R. 1971. *The uses of structuralism*. London: Heinemann.
Bourbaki, N. 1950. The architecture of mathematics. *The American Mathematical Monthly* 57(4). 221–232.
Boyer, C. B. 1991. *A history of mathematics*. New York: Wiley.
Brèal, M. 1899. *Essai de Sémantique (Science des Significations)*. Paris: Hachette.
Broekman, J. M. 1974. *Structuralism: Moskow — Prague — Paris*. Dordrecht & Boston: Reidel.
Bundgaard, P. 2004. The ideal scaffolding of language: Husserl's fourth *logical investigation* in the light of cognitive linguistics. *Phenomenology and the Cognitive Sciences* 3. 49–80.
Cassirer, E. 1945. Structuralism in modern linguistics. *Word* 1. 99–120.
Chomsky, N. 1965. *Aspects of the theory of syntax*. Cambridge: MIT Press.
Chomsky, N. 2002. *Syntactic Structures*. Berlin & New York: Mouton de Gruyter.
Cuvier, G. 2009. *Essay on the theory of the Earth*. Cambridge: Cambridge University Press.
De Palo, M. 2016. *Saussure e gli strutturalismi: Il soggetto parlante nel pensiero linguistico del Novecento*. Roma: Carocci.
Dosse, F. 1997. *History of structuralism, volume I: The rising sign, 1945–1966*. Minneapolis & London: University of Minnesota Press.
Drummond, J. J. 2003. Husserl's third *logical investigation*: Parts and wholes, founding connections, and the synthetic a priori. In D. O. Dahlstrom (ed.), *Husserl's logical investigations*, 57–68. Dordrecht: Kluwer.
Edie, J. M. 1977. Husserl's conception of "the grammatical" and contemporary linguistics. In J. N. Mohanty (ed.), *Readings on Edmund Husserl's logical investigations*, 137–161. The Hague: Nijhoff.
Flack, P. 2018. *Entre phénoménologie et structuralisme: Idée, Expression, Vécu*. Paris: Hermann.
Foucault, M. 2002. *The Order of Things*. London & New York: Routledge.
Frigg, R. & I. Votsis. 2011. Everything you always wanted to know about structural realism but were afraid to ask. *European Journal for Philosophy of Science* 1(2). 227–276.
Galofaro, F. 2006. Dall'intuizione alla commutazione: Hjelmslev, Husserl e i logici polacchi. *E/C: Rivista dell'associazione italiana di studi semiotici on-line*: 1–24.
Hjelmslev, Louis. 1969. *Prolegomena to a Theory of Language*. Madison-Milwaukee-London: The Universiti of Wisconsin Press.
Holenstein, E. 1975. *Roman Jakobsons phänomenologischer Strukturalismus*. Frankfurt: Suhrkamp.
Holenstein, E. 1976. *Linguistik, Semiotik, Hermeneutik: Plädoyers für eine strukturale Phänomenologie*. Frankfurt: Suhrkamp.
Holenstein, E. 2005. Jakobson and Husserl: A contribution to the genealogy of structuralism. In R. Bernett, D. Welton, and G. Zavota (eds.), *Edmund Husserl: critical assessments of leading philosophers, volume IV: The web of meaning: language, noema, and subjectivity and intersubjectivity*, 11–48. London & New York: Routledge
Holenstein, E. In publication. *Phenomenological phenomenology of language: Scattered papers*. Geneva: sdvig.
Husserl, E. 2001a. *Logical Investigations*. vol. 1. London & New York: Routledge.
Husserl, E. 2001b. *Logical Investigations*. vol. 2. London & New York: Routledge.
Koerner, E. F. K. 1976. Towards a historiography of linguistics: 19th and twentieth century paradigms. In H. Parret (ed.), *History of linguistic thought and contemporary linguistics*, 255–280. Berlin & New York: de Gruyter.
Lepschy, G. C. 1970. *A survey of structural linguistics*. London: Faber & Faber.
Lepschy, G. C. 1981. Osservazioni sul termine *Struttura*. In G. C. Lepschy (ed.), *Mutamenti di prospettiva nella linguistica*, 37–73. Bologna: Il Mulino.
Matthews, P. 2003. *A short history of structural linguistics*. Cambridge: Cambridge University Press.
Münch, D. 2002. The relation of Husserl's *logical investigations* to descriptive psychology and cognitive science. In F. Stjernfelt, and D. Zahavi (eds.), *100 years of phenomenology — logical investigations revisited*, 199–215. Dordrecht: Kluwer
Orth, E. W. 1973. Philosophy of language as phenomenology of language and logic. In M. Natanson (ed.), *Phenomenology and the social sciences*, vol. 1, 323–360. Evanston: Northwestern University Press.
Petrilli, S. 2012. Structure and structuralism in philosophy of language and semiotics. *Segni e comprensione* XXVI(78). 44–62.
Piaget, J. 1970. *Structuralism*. New York: Basic Books.
Piana, G. 2013a. L'idea di uno strutturalismo fenomenologico. In G. Piana (ed.), *Strutturalismo fenomenologico e psicologia della forma*, 5–17. http://www.lulu.com/shop/giovanni-piana/strutturalismo-fenomenologico-e-psicologia-della-forma/paperback/product-21332317.html (accessed 20 February 2018).
Piana, G. 2013b. Momento figurale e qualità ghestaltica. In G. Piana (ed.), *Strutturalismo fenomenologico e psicologia della forma*, 101–119. http://www.lulu.com/shop/giovanni-piana/strutturalismo-fenomenologico-e-psicologia-della-forma/paperback/product-21332317.html accessed 20 February 2018.
Rosado Haddock, G. E. 2006. Husserl's philosophy of mathematics: Its origin and relevance. *Husserl Studies* 22(3). 193–222.
Simons, P. M. 1982. Three essays in formal ontology. In B. Smith (ed.), *Parts and moments: Studies in logic and formal ontology*, 111–260. München & Wien: Philosophia.
Simons, P. M. 2001. Categories, construction, and congruence: Husserl's tactics of meaning. In R. Gaskin (ed.), *Grammar in early twentieth-century philosophy*, 54–74. London: Routledge.
Smith, B. & D. W. Smith. 1995. Introduction. In B. Smith & D. W. Smith (eds.), *The cambridge companion to Husserl*, 1–45. Cambridge: Cambridge University Press.
Sokolowski, R. 1977. The logic of parts and wholes in Husserl's *investigations*. In J. N. Mohanty (ed.), *Readings on Edmund Husserl's logical investigations*, 94–112. The Hague: Nijhoff.
Sonesson, G. 2012. The meanings of structuralism: Considerations on structures and gestalten, with particular attention to the masks of Lévi-strauss. *Segni e comprensione* XXVI(78). 84–101.

Stjernfelt, F. 2007. *Diagrammatology: An investigation on the borderlines of phenomenology, ontology, and semiotics*. Dordrecht: Springer.
Sturrock, J. 2003. *Structuralism*. Oxford: Blackwell Publishing.
Swiggers, P. 1981. The relationships between phenomenology and structuralism: Some critical remarks. *Ars Semiotica* 4(3). 263–268.