



Noema and Noesis. Part II: Functions of Noematic Synthesis

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Abstract

In the paper, being the second part of the work entitled *Noema and Noesis*, the formal model of the noematic synthesis functions is presented. Together with functions of noetic synthesis, they are understood as components of functions of intentional reference, which are to be, in turn, formalizations of intentional acts of reference performed in the stream of consciousness. Noemata are understood as mental representations associated with mental worlds. The processes of their synthesis in the mind engage the work of many noematic functions: generating predicative senses, producing noematic cores, and locating noemata in mental worlds (mental spaces). The constructed model is not intended as the faithful reconstruction of the Husserlian conception of noemata. Intuitions of the creator of phenomenology are treated as the only source of inspiration.

Keywords Noematic synthesis functions · Noema · Noematic cores · Noematic characters · Noematic backgrounds · Noematic perspectives · Apophantics · Mental worlds

1 Introduction

In the first part of the work, entitled *Noema and Noesis. Part I: Functions of Noetic Synthesis*, the formalization of functions of noetic synthesis is presented. The superpositions of these functions with the functions of noematic synthesis create reference functions whose arguments are states of the brain, while the values are intentional objects or situations located in mental worlds. In the present article, the formal model of noematic synthesis functions is presented.

Husserl presented the concept of a noema in the way which allows us to interpret it in different manners (Mohanty 1985; Drummond 1997, 494–499; Kosowski 2008).

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According to the Californian interpretation, the noematic stratum of any intentional reference act is composed of two components: a noematic sense (a noematic core and a noematic nucleus) and a noematic character, called a way of givenness of an object of reference. Furthermore, the noemata are entangled in various structures of possible worlds, constituting their various noematic horizons. According to the Californian interpretation, noemata are intensional beings, just like Fregean *sinnes* (Føllesdal 1969, 1972; Pańniczek 1987; Smith and McIntyre 1982, 130–136; Krysztofiak 1995; Krysztofiak and Pietruszczak 1997).

According to the cognitive paradigm, noemata may be interpreted as mental representations synthesized by the mind and then encoded in it within more complex mental structures called mental spaces. Such a paraphrase makes it possible to immerse the concept of a noema in cognitive theories of mental spaces understood by cognitive scientists as mental structures, thanks to which language users perform various acts of reference with words to various fragments of worlds. Cognitivists comprehend mental spaces, just as phenomenologists from the California school understand noematic structures. This similarity is functional. Both mental spaces and noemata are treated as mental tools (mediators) for performing acts of reference. The difference that appears between the understanding of mental spaces and the understanding of noemata in the Californian meaning is that mental spaces are conceived as dynamic structures *in statu nascendi*, while noemata are characterized as relatively stable structures resembling Fregean senses from the “third Platonic kingdom”. From this point of view, mental spaces would function as dynamically evolving horizontal structures in the stream of consciousness, incessantly synthesized and modified by the mind for the use in its various intentional actions, whereas noemata might be treated as relatively stable constituents of these structures. The processes of such synthesis can be modelled as applications of various noetic functions to the components of the noematic stratum of mental acts.¹

The model of the noematic synthesis functions presented in the article is not intended as faithful reconstruction of Husserl’s views. The constructed model is only inspired by Husserl’s phenomenology. Its characteristic feature is that it uses the concept of mental worlds or mental spaces stemming from cognitive linguistics.

¹ Some cognitivists notice many similarities between phenomenological concepts of intentionality and theories developed on the basis of cognitive linguistics. In (Wiggins and Spitzer 1997, 104), one may read: „the evolving theories of cognitive science are actually proving to be co-genial to positions in phenomenology. Cognitive science is beginning to show how much of the experienced world depends upon the productive capacities of mental processes. It is also substantiating/.../the functioning of pre-conceptual prototypes, metaphorical mappings, imagination, and gestalt wholes at the most basic levels of awareness. Neuroscience is even demonstrating the central role of the lived body in shaping experience. In its own naturalistic fashion, then, cognitive science is confirming the primacy of perception and the lifeworld in the development of human consciousness. It is to be hoped that the future will see fruitful exchanges between cognitive scientists and phenomenologists.” Zlatev (2010, 438) describes the relationship of phenomenology and cognitive linguistics in a similar way: “/.../I have argued that while the explicit philosophy and the meta-theory of „mainstream” CL are largely incongruent with phenomenology, the thinking of less „prototypical” representatives of CL such as Itkonen, Sinha, Harder and Zlatev, and perhaps more importantly: the *practice* of CL has some considerable overlaps with phenomenology.”

In this way, noemata, under the Californian interpretation, may be interpreted as components of mental spaces described in (Fauconnier 1994, 2007).

Phenomenologists claim that the noematic stratum of an intentional act is composed of two components: a noematic sense and noematic characters understood as ways of givenness of intentional objects or situations. Accordingly, functions of a noematic synthesis may be understood as the applications of functions of noematic character to functions of synthesis of noematic sense.

2 The Noematic Sense Functions

The noematic sense of any intentional act is a structure comprising two components: a pure X or a “determinable X” (sometimes called a noematic pole by phenomenologists) and predicate senses (predicative content), which are inter-connected by various logical, semantic and ontological relations.

2.1 A Pure X

In Husserl’s *Ideas I* a pure X is characterized in two ways. According to the first way, a pure X is treated as an internal component of the noematic sense of an intentional act and it is identified with an intended object. The second way of Husserl’s characterizing a pure X assumes that it is a constituent of a noematic sense by means of which a conscious subject refers to an intentional object (Drummond 1990, 135–138; 1992, 1997). According to the Californian interpretation, the function of pure X in a noema can be interpreted as indexing the object of a reference act.² A pure X fulfills a role of a demonstrative by pointing to a given object of a reference act. The pure X is an index indicating the intentional object of the act. Thanks to the pure X, designating an object, the mind assigns to the given intentional object various contents that make up the noematic sense of a given noema. Therefore, the pure X may be called the directional indicator of any act of referring to an object or a situation. The pure X may also be interpreted as a mental, indexical mechanism for assigning various predicate senses to the same intentional object.

How does the activation of a pure X occur when the mind performs a reference act? It seems that noetic intentions activate an appropriate pure X for the sake of performing the corresponding intentional acts of reference. Noetic intentions determine the number of intentional objects to which the mind intends to refer in a given reference act, guided by a given noetic intention. One can refer to many objects in a single intentional act of reference. Such acts can be called multi-directional.³ It

² In *Ideas I* Husserl (1983) claims that an intentional object “becomes separated as the *central noematic moment*: the “*object*” (*Gegenstand*), the “*Object*” (*Objekt*), the “*Identical*,” the “determinable subject of its possible predicates”—the pure X in abstraction from all predicates—and it becomes separated from these predicates or, more precisely, from the predicate-noemas” (*Ideas I*, 313).

³ Multi-directionality of reference acts is mapped by the syntax of the language of predicate logic. From the logical point of view, the syntax of predicate logic allows us to construct propositional functions with n-argument predicates. Language practice, however, shows that we use predicative constructions with up to a few arguments - up to four or five arguments.

seems, however, that there is a certain limit in the number of objects to which the mind can refer in one act of intentional reference. Perhaps, it is determined by our ability to subitize, that is, the ability to simultaneously apprehend many items which appear on the scene of visual perception. Researchers who deal with cognitive counting mechanisms speak of the number three or four as the limit of our human subitizing abilities (Carey 2004; Le Corre and Carey 2007; Krysztofiak 2016). A pure X, called sometimes a noematic pole of a noema, may be treated as an individual conceptual variable, which represents an intended individual intentional object. If many noematic poles occur in a given noema, then such a noema manifests its multi-directionality.

Since the functions of noetic intentions determine noematic poles in noemata, what is the mechanism responsible for the fact that the mind is able to refer to the same intentional object through various acts of intentional reference guided by various noetic functions? How is it that there are the same pure Xs (noematic poles) in different noemata?

The fact that John has to give me money may be the purpose for which I look for him during the banquet. The fact that I want to praise John for good results on the exam may be the goal that governs my predictions about John's career. In both cases, I perform various acts of intentional reference to John. Moreover, different noemata participate in these acts. However, the same pure X occurs in these noemata and it is responsible for the fact that I am referring to the same John. How is it possible that two different functions of noetic intention determine the same pure X occurring in two different noemata? The functions of noetic intention can be understood as actions of adapting a given possible situation to a given world, in which the acts of reference are realized. For example, I adapt a possible situation in which John gives me money to the world in which the banquet takes place and I participate in it. The purpose of adapting the above-described situation to the world of the banquet motivates me to perform the act of looking at John. This means that noetic intentions comprise many various specific aims. Some of them are goals of referring to specific objects. If two different functions of noetic intention are based on a common goal of referring to a given object, then they determine the same noematic pole for two different noemata. I am able to look at the same John many times in different circumstances because my various noetic intentions that govern my acts of looking at John comprise the common aim of referring to John. Hence, the same noematic pole occurs in various noemata, which mediate in intentional acts of looking at John.

2.2 Predicate Senses

Predicate senses are mental representations of properties of objects or relations obtaining between objects. If a given predicate sense is “semantically fulfilled” in an object, then it represents some of its properties. Predicate senses are therefore conceptual entities. They may be interpreted as notions synthesized and encoded in the mind. Each predicate sense occurs in every noema along with some value of its

satisfaction. There are two extreme values of satisfaction, namely: being satisfied maximally and being unsatisfied maximally. Values of satisfaction mean the degree to which properties or relations are assigned to objects by the mind. When the mind refers to some intentional object in the aspect of its non-redness, then in the noema entangled in such an act of intentional reference there is a predicate sense of being red with the value of being unsatisfied maximally or, in other words, with the value of being satisfied in zero degree. On the other hand, in the act of perceiving something red, the predicate sense of being red usually occurs in noemata of these acts with the value of maximal satisfaction. We often experience situations in which we assign the content to various objects in an uncertain manner. When we perceive a figure in front of a store, sometimes we experience uncertainty as to whether it is a man or a mannequin. In another mental act in the same situation, we can refer to the same intentional object as the mannequin, experiencing a similar lack of certainty. In such acts of intentional reference, we attribute to the intentional object the content of being human with some intermediate value of satisfaction. Having the same directional indicator (a pure X) and the predicate content (the predicative determinations), the noemata can differ only due to the values of satisfaction of the predicate senses.

How values of satisfaction are attributed to predicative determinations in a given noema? Answering to this question, it can be assumed that two functions are involved in the process of predicate senses synthesis. What value of satisfaction will be assigned to the predicative determination by the mind when performing the act of reference depends on the noetic properties of this act. First, the noetic synthesis function activates the corresponding function of the noematic synthesis, which in turn generates predicate senses by assigning appropriate satisfaction values to predicative determinations. For example, by participating in a garden party, I want to meet John, because he has to pay me the money back. The function of noetic synthesis (in particular, the function of noetic intention being the component of the former) evokes my reference to John, which results in my looking at him, sitting on a bench next to the tallest tree in the garden. In the act of visual perception, my mind synthesizes a noema whose component is the predicative determination of sitting on a bench. Because my act of looking at John is saturated with the relevant hyletic data (qualia), the function of the noematic synthesis assigns the maximal value of satisfaction to this predicative determination. As a result, I am experiencing the feeling of obviousness that John is sitting on the bench.

Let *N-POLES* be the set of all noematic poles, *P-DETERMINATIONS*—the set of all predicative determinations, and *S-VALUES*—the set of all values of satisfactions. Let us extend the range of application of predicate (introduced in *Noema and Noesis. Part I: Functions of Noetic Synthesis*) “*” to the sum *N-POLES* \cup *P-DETERMINATIONS* \cup *S-VALUES*. This predicate expresses the property of being active. In the same way let us extend the relation of activating to the field of noematic poles, predicative determinations, and values of satisfaction. Let us adopt the following axioms:

$$(A1) \quad (\forall x)[x \in N\text{-POLES} \rightarrow ((\exists h)(h \in NOESIS \wedge h \text{ activates } x) \rightarrow x^*)]$$

(A2) $(\forall d)[d \in N\text{-DETERMINATIONS} \rightarrow ((\exists h)(h \in NOESIS \wedge h \text{ activates } d) \rightarrow d^*)]$

(A3) $(\forall y)[y \in S\text{-VALUES} \rightarrow ((\exists h)(h \in NOESIS \wedge h \text{ activates } y) \rightarrow y^*)]$

The mentioned axioms (A1), (A2), and (A3) are trivial. They only introduce the concept of activation of noematic poles, noematic determinations and satisfaction values by appropriate functions of noetic synthesis. (A1), (A2) and (A3) do not exclude the situation in which noematic poles, noematic determinations and satisfaction values are active, whereas any function of noetic synthesis is not active.

The next axiom associates the concept of predicative determinations with the notion of a function of noematic synthesis *NOEMA*.

(A4) $(\forall d, h)[d \in N\text{-DETERMINATIONS} \wedge h \in NOESIS \wedge h \text{ activates } d \rightarrow (\exists g, y)(g \in NOEMA \wedge h \text{ activates } g \wedge y \in S\text{-VALUES} \wedge h \text{ activates } y \wedge g(d) = y)]$

(A4) expresses that for every function of noetic synthesis h , which activates a given predicative determination d , there is a function of noematic synthesis, activated by the noetic function h , which assigns predicative determination d to some value of satisfaction, also activated by the function h . One may define predicate senses as ordered pairs which consist of an active predicative determination and its active value of satisfaction.

(DF 1) $(\forall d, y)[\langle d, y \rangle \in P\text{-SENSES} \equiv_{df} d^* \wedge y^* \wedge d \in N\text{-DETERMINATIONS} \wedge y \in S\text{-VALUES} \wedge (\exists g)(g \in NOEMA \wedge g^* \wedge g(d) = y)]$

According to (DF1), the components of predicate senses must be connected in such a way that the second component is the value of satisfaction attributed to the first one by some function of noematic synthesis. The mental mechanism of the synthesis of a predicate sense works as follows: (1) first, a certain function of noetic synthesis activates a given predicative determination, a corresponding value of satisfaction, and finally a function of the noematic synthesis; (2) then the function of the noematic synthesis, activated in the first stage, attributes the active value of satisfaction to the activated predicative determination; (3) in this way the active function of noematic synthesis generates a predicate sense composed of the given predicative determination and its value of satisfaction. Functions of noematic synthesis, truncated in the field to the function of attributing values of satisfaction to predicative determinations, can be called the functions of generating predicate senses.

(DF2) $(\forall g)[g \in GEN \equiv_{df} g \in NOEMA \wedge (\exists d, y)(\langle d, y \rangle \in P\text{-SENSES} \wedge g(d) = y)]$

2.3 Noematic Cores

Noematic cores are conceptual structures which comprise a noematic pole or poles and appropriate predicate senses. They may be formalized as n-tuples of the

following shape: $\langle \{x_1, \dots, x_n\}, \{\langle d_1, y_1 \rangle, \dots, \langle d_k, y_k \rangle\} \rangle$, where x_1, \dots, x_n , are noematic poles and $\langle d_1, y_1 \rangle, \dots, \langle d_k, y_k \rangle$ are predicate senses. A noematic core with one noematic pole takes the shape: $\langle \{x_1\}, \{\langle d_1, y_1 \rangle, \dots, \langle d_k, y_k \rangle\} \rangle$. This structure expresses the fact that the predication relation obtains between the noematic pole and predicate senses. For example, when I refer to John as my teacher, then in my mind the noematic core, taking the form: x as *John and my teacher* ($\langle x, \langle \textit{being John, I} \rangle, \langle \textit{being my teacher, I} \rangle \rangle$), activates itself. In this case, the value I designates the maximal value of satisfaction. If I am referring to John as my teacher in a situation in which I am not sure if he is standing on the sidewalk in front of the store, the noematic core activated in my mind can take a different shape with respect to values of satisfaction: $\langle x, \langle \textit{being John, } \frac{1}{2} \rangle, \langle \textit{being my teacher, } \frac{1}{2} \rangle \rangle$.

The relation of predication that occurs in the noematic core between the pole and the predicate senses should not be understood in the meaning of the classical predicate logic. In the Meinongian semantics, two predication relations are distinguished, namely, the relation of external predication and internal predication.⁴ The classical predicate calculus is the theory of external predication. The essential feature of this kind of predication is that properties or relationships may be attributed to objects that exist in a given world or a given semantic model. For example, because the highest golden mountain does not exist in the world that we recognize as real, we cannot predicate of this mountain that it is a golden mountain. From the external predication point of view, the phrase “Highest golden mountain is gold” is false because there are no golden mountains in the world. From the point of view of internal predication, the same sentence is, in turn, true. It is tautological even. Although the highest golden mountain does not exist in the world that we consider to be real, it exists in another world as possessing its own properties, which are of internal nature from the point of view of the world recognized as real. It can be said that the internal properties of objects are revealed when the mind refers to these objects from the viewpoints of worlds in which they do not exist. From the point of view of worlds in which there are objects of our acts of reference, noemata do not exist in them. Although their content reveals to us in the immanent perception, we do not attribute this content to noemata on the basis of external predication. Predicate senses form the content of the noemata internally. The properties, which constitute predicate senses of the noemata, constitute, in turn, their substance. In the noema: x as *the highest golden mountain*, the predicate sense *being the highest golden mountain* is attributed internally to x . This, however, allows the mind to refer to the given intentional object by means of the phrase “Highest gold mountain” and, as a result,

⁴ The conception of two modes of predication stems from Ernst Mally’s ontology (1912). Subsequently, this distinction was used by Ingarden in his theory of pure intentional objects. In Castañeda’s guise theory (Castañeda 1974, 1977, 1985/86, 41–45) the similar distinction is applied in the analysis of reference acts. Some phenomenologists compare guises with noemata (Küng 1990). According to the Californian interpretation, noemata are not objects of reference, while Castañeda’s guises are what we refer to in our all cognitive acts. In Zalta’s theory of abstract objects, the distinction on encoding and exemplification is analogous to the distinction of internal and external predication (Zalta 1988). The discussion on the internal and external predication, carried out in the Meinongian logic, is presented in (Pañniczek 1998; Sendlak 2018, 106–141).

to formulate, for example, the true statement that the highest mountain is gold in such and such a story. The relation of internal predication holding between predicate senses and noematic poles in a noematic core enables the mind to predicate externally of intentional objects appropriate properties and relations.

Let us define the set of noematic cores in the following way:

$$(DF3) \quad (\forall x_1, \dots, x_p, P) [\langle \{x_1, \dots, x_p\}, P \rangle \in N-CORE \equiv_{df} \{x_1, \dots, x_p\} \subset N-POLES \wedge PCP-SENSES \wedge x_1^* \wedge \dots \wedge x_p^* \wedge (\exists g)(g \in NOEMA \wedge g^* \wedge g(\{x_1, \dots, x_p\}) = P)]$$

Functions of noematic synthesis, truncated in the field to the function of attributing sets of predicate senses to sets of noematic poles, can be called the functions of noematic predication.

$$(DF4) \quad (\forall g)[g \in PRED \equiv_{df} g \in NOEMA \wedge (\exists x_1, \dots, x_p, P) (\langle \{x_1, \dots, x_p\}, P \rangle \in N-CORES \wedge g(\{x_1, \dots, x_p\}) = P)]$$

2.4 Noematic Formal Apophantics

Predicative determinations entangled in noematic cores stand in various relationships with other predicative determinations. The net of such relationships constitutes logical, semantic and ontological structures, whose unity correlated to a given noema may be called its formal apophantics.⁵

For instance, on the basis of classical logic, it is logically impossible that something can both have and do not have a certain property. So, it is excluded that two predicate senses of shapes: $\langle d, I \rangle$ and $\langle d, 0 \rangle$, where d is any predicative determination, I is the maximal value of satisfaction and 0 is the minimal value of satisfaction, may belong to any predicate sense being a constituent of any noematic core. On the other hand, on the basis of some paraconsistent logic, such a situation might be allowed. It seems that the structure of classical logic, which is affiliated with a given noema, allows only the binary valuation of predicative determinations with their satisfaction values. The logical structures in which noemata are entangled, enable the mind to process them, and, finally, to carry out inference operations.

Predicative determinations may be, for instance, entangled in extensional distributive ontology or in some kind of mereological ontology. The predicative determination: *to be a man*, may be entangled not only in the distributive ontology, described by the

⁵ The conception of apophantics was introduced by Husserl (1983) in *Ideas I*. Husserl understands apophantics as „the universal formal ontology” (*Ideas I*, 249) or as “a theory of the forms of apophantic posita, respectively syntaxes” (*Ideas I*, 276). Because noemata are shaped by transcendental consciousness into various forms, there is a need to build a theory that would generate all the possible forms in which noemata are involved in the processes of their noematic synthesis. Formal apophantics may be understood as the so called “ontology_t”. This notion was introduced in (Poli and Obrst 2010) and it is understood as a theory of various “software usable models” (Poli and Obrst 2010, 4). Each formal apophantics co-ordinated with a given noema may be treated as its “software program” enabling the mind to process a given noema on three levels.

set theory, but also in the ontology of general systems theory. In the noema of the act of reference to a man standing under a tree, being a human indicates a certain set of objects, whereas in a noema of the act of reference to the same man in the medical diagnosis of functioning of his immune system, being a human is entangled in the formal category of system. The predicative determination: *to be a forest*, indicates some collective set of trees. In this case, any noema in which such a predicative determination occurs, is entangled in some mereological ontology.⁶ Predicative determinations, which are constitutive for noemata mediating in reference acts directed to theoretical entities of quantum physics, indicate ontological categories such as: events, states and even alternative worlds. Formal ontologies, in which predicative determinations constitutive for noemata belonging to reference acts occurring in story telling practices, comprise such structures like actions, plots, fables and histories. For example, the predicative determination: *to be a war*, is entangled in the ontological structure, which comprises such entities as actions, their sequences, processes and even plots and fables.

Semantic relationships connecting predicate determinations are constituted by various so-called folk theories encoded in our minds. Such mental theories are synthesized by minds within representational systems of core human competences. Some representatives of cognitive science distinguish at least five modules of the core knowledge, comprising abilities to represent (1) inanimate objects and their mutual interactions and relationships, (2) to represent agents and their goal-oriented acts, (3) to represent cardinalities, ordinals and magnitudes, (4) to represent geometrical places and regions in their layout, and, finally, (5) to represent social partners, groups, their members in mutual social entanglement (Kinzler and Spelke 2007; Spelke and Kinzler 2007). For example, the core cognitive system of representing social partners, groups and their members enables the mind to develop various folk social theories, which even may be incommensurable. The behaviors that manifest hostility according to certain cultural codes may be regarded as neutral in cultural systems with different codes of hostility and friendship. Every human mind builds and modifies hundreds of folk theories on a variety of topics over the course of its life. These theories constitute nets of semantic relations obtaining between predicative determinations. People may have different theories of stones, which will include, for example, meaning postulates, such as: *every stone is dead and inanimate; stones can be cast onto people and animals; stones sometimes kill; stones are used to build houses*, etc. One may imagine another folk theory of stones which will be comprising such assertions as: *some stones have divine power; stones sometimes bring happiness; some stones are precious; losing the holy stone brings*

⁶ The purpose of contemporary research in the field of formal ontology is to construct various formal structures that can serve as tools for formalizing noematic ontological networks into which predicative determinations are involved. There are no clear borderlines between logical structures and ontological forms. Some logicians maintain the position that any arbitrary logical calculus is a formal ontology (Cocchiarella 1991, 640–647). Some phenomenologists distinguish formal ontologies from intuitionist ones. Ontologies of the second type are constructed according to the tradition of Brentano, Husserl and Ingarden (Smith 1978, 39–62). At any rate, formal ontological theories are axiomatic theories describing formal domains within at least three formal approaches: (1) the set theoretic, extensional approach, (2) the mereological, Leśniewskian way of comprehending entities as wholes, parts and complex structures founded upon the former, and, finally, (3) the approach based on Mac Lane's category theory, where the basic ontic categories are morphisms. Currently, Herre (2010) tries to develop General Formal Ontology (GFO).

misfortune, stones are used for stoning sinners. Both folk theories of stones impose on the predicative determination: *to be a stone*, different networks of semantic relations.

Let L , O and S be, respectively, sets of all logical theories, all ontological theories and all folk semantic theories understood as establishing corresponding structures. Let the following axioms describe relations obtaining between them:

$$(A5) \quad L \cap O = \emptyset, (A6) \quad L \cap S = \emptyset, (A7) \quad O \cap S = \emptyset$$

One may distinguish three partial functions within each function of formal apophantics. The first function LOG assigns a logical theory (a logical structure) to a given noematic core. The second function ONT attributes an ontological theory (an ontological structure) to a given noematic core, and, finally, the third function SEM imposes a semantic theory (a semantic structure) on a given noematic core. Their definitions are as follows:

$$(DF5) \quad (\forall g)[g \in LOG \equiv_{df} (\exists l, n)(n \in N-CORES \wedge l \in L \wedge g(n) = l)]$$

$$(DF6) \quad (\forall g)[g \in ONT \equiv_{df} (\exists o, n)(n \in N-CORES \wedge o \in O \wedge g(n) = o)]$$

$$(DF7) \quad (\forall g)[g \in SEM \equiv_{df} (\exists s, n)(n \in N-CORES \wedge s \in S \wedge g(n) = s)]$$

The function of formal apophantics $APOPHANTICS$ may be defined in the following way:

$$(DF8) \quad (\forall g)[g \in APOPHANTICS \equiv_{df} g \in NOEMA \wedge (\exists h_1, h_2, h_3, n)(n \in N-CORES \wedge h_1 \in LOG \wedge h_2 \in SEM \wedge h_3 \in ONT \wedge g(n) = \{h_1(n), h_2(n), h_3(n)\})]$$

The function $APOPHANTICS$ is a function of noematic synthesis which assigns the set composed of three elements, generated by, respectively, functions: LOG , SEM and ONT , to any noematic core.

Noemata NM may be defined as representational structures composed of noematic cores and values of the function $APOPHANTICS$.

$$(DF9) \quad (\forall r)[r \in NM \equiv_{df} (\exists n, g)(n \in N-CORES \wedge g \in APOPHANTICS \wedge r = \langle n, g(n) \rangle)]$$

Noemata are just those structures on which the functions of noematic character operate, forming more complex noematic structures, called noemata in mental worlds (in mental spaces).

3 The Noematic Character Functions

The notion of the noematic character has not been precisely explained by Husserl. He describes them as noematic correlates of noetic characters. Husserl suggests that noematic characters are ways of existence in which objects of reference acts present

themselves to the mind.⁷ Phenomenologists from the California School embrace, in turn, noematic characters as ways of givenness of intentional objects to a subject who refers intentionally to them (Føllesdal 1969; Smith and McIntyre 1982, 130–133). The category of modes of existence, however, is very ambiguous. Among phenomenologists there is no clear agreement what these modes or ways of existence are.⁸

Since noetic characters are divided into two types: noetic moods and noetic modes (see *Noema and Noesis. Part I: Functions of Noetic Synthesis*) and the noematic characters should be correlates of noetic characters, their two types should be also distinguished, namely: noematic backgrounds and noematic perspectives (Krysztofiak 2008, 266–271).

3.1 Noematic Backgrounds

The noematic backgrounds are semantic correlates of noetic moods in the meaning that the objects to which we refer intentionally, appear to the mind as given in a certain content domain. Every noetic mood is always the implicit awareness of such a domain. Referring to the heroes of some novel, the mind captures them on the noematic background of fictitiousness. The background of reality, in turn, accompanies the feeling of reality, present in the acts of visual perception. When a mathematician refers to imaginary numbers, she(he) refers to them on the background of abstractness or on the background of ideality in the Platonic meaning. The noetic moods accompanying intentional acts of reference in religious ecstasies are correlated with the numinotic background of acting forces. Such an object, to which we refer intentionally, is given to the mind in the feeling of dominantly affecting us. We perceive it as a being that “can do something good or bad to us with its strength”. In addition to reality, fictitiousness, ideality, and numinoticity, one may distinguish, among others, such noematic backgrounds as: vitality, lifelessness, inter-personality, unreality, temporality in the varieties of: the past, the present and the future. The vital background contributes to the fact that when we refer to something, we apprehend it as something alive. When I sit on the grass, I do not have to refer to it on the vital

⁷ In *Ideas I*, Husserl (1983) introduces the notion of being-modalities as correlates of various types of noetic “positing”. He writes: “/.../every “posited characteristic” in the widest sense, constituted in the noema/.../as correlate of noetic “positing”/.../belonging to the cogito, undergoes transmutation into a being-characteristic and accordingly takes on the form of a *modality of being in the widest of all senses*. In this way the characteristic of “probable”, which is the noematic correlate of deeming likely/.../is converted into being probable. Similarly, the noematic characteristic of “questionable”, this specific correlate of positing of questionability, is converted into the form of *non-being/.../*. We will find grounds for extending the concept of positing to all act-spheres and thus speak of, e.g., liking-positing, wishing-positing, willing-positing, with their noematic correlates ‘likes’, ‘wished for’, ‘ought to be in the practical realm’, and the like. These correlates also take on the form of being-modalities in the extremely extended sense/.../ (*Ideas I*, §114).

⁸ Ingarden understands the ways of existence differently than Husserl. According to the former, the ways of existence are determined by the so-called moments of existence (modes of being such as autonomy, heteronomy, independence, dependence, originality, derivativeness, sufficiency, non-sufficiency, etc. (Chrudzimski 2015).

background. But when I water it in my garden, it appears to me as a living being. Deliberately avoiding snails on the pavement also manifests that I refer to them on the vital background. The background of lifelessness, in turn, is the domain in which objects of intentional acts appear to be lifeless or even dead or dying. In relation to the vitality, the background of lifelessness is its anti-background. The same relation occurs between reality and unreality. For example, an atheist refers to the gods on the background of unreality. The background of inter-personality is correlated with the mood of noetic awareness that we communicate with someone. In the acts of praying, when the mind refers to the crucifix, it captures it on the inter-personal background as an object to which one can speak and with which one can communicate. Staring at a stone, we experience the awareness that one cannot talk to it. In this case, the intentional reference toward the stone, if it is not, for example, an amulet, takes place on the “anti-inter-personal background”. In intentional acts of remembering or reminding, and sometimes in acts of confabulation (fabrication), the noematic background of the past is associated with a noetic mood of the feeling of transience. In intentional planning actions, in turn, the noetic mood of the passage of time is accompanied by the noematic background of the future.⁹

Noematic backgrounds have their degrees of intensity. During typical sexual practices, lovers relate to each other on the background of vitality with high intensity. The butcher, in turn, while performing his professional duties, generally refers to “his victims” on the background of vitality with low intensity. In situations when he begins to “bite the conscience”, the intensity of the background of vitality, on which his victim is given to him (a piggy, a calf), increases sharply. Similarly, when we realize the fact that each of us has to die one day, the thanatic background in which we refer to our relatives is rather low. This changes in a situation of observing a dying person close to us in a hospital. When we identify the movie’s hero with our neighbor, then our reference to the hero of the movie takes place against the background of fictitiousness with lower intensity than when we do not make such comparisons, staring at the TV screen. In the actual stream of intentional actions, the intensities of the noematic backgrounds change. Their violent changes evoke various states of shock, trauma, surprise (nice or unpleasant), and consternation, etc.¹⁰

⁹ The notion of the noematic backgrounds, introduced in the article, should be distinguished from the concept of the background understood by Searle as “a set of nonrepresentational mental capacities that enable all representing to take place” (Searle 1983, 143), or in other words, “it is a set of skills, stances, preintentional assumptions and presuppositions, practices, and habits” (Searle 1983, 154). Noematic backgrounds are only content-domains, which are activated during the execution of intentional reference acts by the mind.

¹⁰ In one of the scenes from Almodovar’s film, the situation of a sexual act in which a woman suddenly realizes that her sexual partner is no longer alive, is presented. In this case, the background of vitality with high intensity, in which the woman referred to her partner, turned into a thanatic anti-background also with high intensity. In the next scenes, the director unveils the story of the trauma of the heroine of the film. In other case, when in front of the shop window we want to ask a character for something, in this situation this figure reveals itself to us in the context of reality and inter-personality. During the intentional action, if it turns out that this figure is a “human-like cardboard stand”, then such an act of intentional identification will be realized against the noematic background of anti-inter-personality. Usually in such situations we experience some kind of consternation.

Noematic backgrounds also merge in intentional mind actions. These mergers, in various combinations, create derivative noematic backgrounds. A model example of the phenomenon of fusion of noematic backgrounds is the situation, in which noematic backgrounds, associated with the noetic mood of passing time, are synthesized. Such a fusion takes place in intentional actions of describing unfinished real stories or inventing fictional stories. In the first case, the backgrounds of the past, the present and the future merge additionally with the background of reality, while in the second one—with the background of fictitiousness. When the child plays with his favorite plush-bear and talks to it, although he is aware of the fact that the toy is not a living or personal object, the background of vitality and the background of inter-personality merge with the backgrounds of anti-vitality and anti-personality. Whether there are limitations to such fusion of noematic backgrounds should be left as an open question for further research. Certainly, during typical intentional actions, there is no merging of any background and its anti-background in a given intentional act. For example, it would be difficult to give an example of an intentional reference act, in which the intentional object is given simultaneously against the background of reality and unreality. Maybe, in the intentional acts carried out during practices of ritual cannibalism or during various paraphilia practices, untypical fusions of noematic backgrounds are synthesized and activated in the mind.

The model of intentionality, which permits various fusions of noematic backgrounds, requires distinguishing the primordial backgrounds, similarly as in the case of hyletic data, the fusions of basic fragrances and tastes form secondary sensory data. Such primordial noematic backgrounds would be correlated with the original noetic moods. The task of distinguishing the latter requires the observation of the stream of consciousness in a very wide spectrum of intentional actions.

3.2 Noematic Perspectives

The noematic perspectives in which objects of reference acts are given in consciousness, are correlated with noetic modes understood as the ways of implementing the noetic force of these acts. If a man looks at a woman with a sense of her sexual desire, she appears to him in some perspective of hedonic values. If I hear someone scream in horror, then the object to which I refer in the act of hearing, is given to me in some axiological perspective. With the noetic modus of clear and expressive observation of something, the perspective of space–time proximity can be correlated. What is given to me as spatially close is often captured in observation by me in a clear way. Conversely, what is given to me as far away is usually seen unclearly by me, as if behind a fog. With the noetic modus of effort in the act of reminding, the perspective of the “far past” can be correlated. When we recall, in turn, something without difficulty, with ease, then such a perspective, correlated with the modus of easy recalling something, can be described as time proximity. When the mind makes calculations, referring to abstract mathematical objects, then these objects are given to consciousness in some non-physical and non-spatial perspective, in contrast to the acts of calculating people participating in a school lesson, which are given to consciousness as the spatial and concrete entities. Still other, for

example, noematic perspectives are: mysteriousness, visibility, invisibility, beginning, final end, absurdity, fluctuation, anomaly and possessive perspectives. The mysteriousness as a noematic perspective in which a reference object is given, can be correlated with intentional acts of taboo questions, scaring someone with some taboo or fearing a taboo. In the first case, the noetic modus is the way of implementing an intentional act that breaks the social order of silence. When the mind refers to objects in a visual way, then these objects are given in the noematic perspective of visibility. In all acts of looking at something, carried out in any way, the intentional object is given in this perspective. Objects given in intentional acts on the noematic background of ideality appear to the mind in the perspective of invisibility (imaginary numbers are invisible). The noematic perspectives of the beginning and the final end in which objects are given in various intentional actions, are revealed, for example, in historical narratives. When we refer to a given person through his(her) date of birth, then such a person as the object of an intentional act is given in the noematic perspective of the beginning. In theological discourse, the world presented as a divine work, is also given in intentional actions in the perspective of the beginning. In intentional acts in which the death of people is dated, the objects of reference are given in the noematic perspective of the end. The cat's smile without the torso and paws that we refer to, while reading *Alice in Wonderland*, is given in the perspective of the absurd. The noematic perspectives of anomalies or fluctuations are ways of giving objects (individuals or processes), conceptualized, for example, in the scientific discourse as deviations from certain laws, rules or norms. Possessive perspectives, in which objects are given to the mind in various intentional actions, are revealed when we embrace them in the first person of singular or plural. Such objects are then given to us as "mine" or "ours". Examples of intentional objects, given in such noematic perspectives are as follows: my country, our city, our party, our church, my God, your business, your mother. These kinds of perspectives are especially revealed in acts of collective intentionality, on the basis of which minds form the so-called *lebenswelt*.¹¹

The noematic perspectives are subject to configuration operations. Their results are also noematic perspectives. Therefore, one can talk about the dimensions and degrees of complexity of these complex, multidimensional perspectives. The configuration of perspectives: the beginning and the end, results in the perspective of final orientation. However, not every noematic perspective can be associated with any noematic background in intentional acts. For example, intentional objects to which we refer on the background of abstractness, such as, for example, numbers and algebraic structures, are not given to the mind in temporal perspectives like time proximity or space proximity. Referring to the number one, the mind does not capture it in the perspective of completed history. Our references to psychic experiences, both our own and others', take place on the noematic, spiritual background. Thoughts, wants, feelings, beliefs cannot be given to us in the perspective of visibility. Such

¹¹ The collective intentionality consists in performing of the so-called acts of expressing we-intentions (Tuomela and Miller 1988; Tuomela 2000). The concept of *lebenswelt* is the main conceptual category in phenomenological sociology, inspired by works of Alfred Schutz.

acts of reading our own or other's mind are always accompanied by the perspective of invisibility.

Many noematic backgrounds allow for co-occurrence with a wide range of noematic perspectives. When the mind refers to various objects against the background of reality, the noematic perspectives in which the intentional objects can be given to him on this background, can take shapes from a wide range of configurational possibilities. The mind can refer to objects on the background of reality in the perspectives of: space–time, spatiality, proximity, mega-remoteness, farness, superficiality, macro scale, nanoscale, microscale, aberration, fluctuation, anomaly, typicality, valence, anti-valence, homeliness, alienation, secretiveness, mysteriousness and even absurdity, and many others. The noematic background of fictitiousness also allows a wide range of perspectives. On the fictional background, we often refer to objects in the perspective of absurdity. For example, when we contemplate Escher's drawings, we refer to geometrically paradoxical objects (stairs starting and ending at the same place) on the fictional background.

Noematic perspectives that are excluded by a given noematic background, can be defined as constituting its anti-scope. The set of all noematic perspectives allowed as the ways of givenness of objects on a given background can, in turn, be defined as the scope of a given noematic background. The scope of a given noematic background can be comprehended formally as a set of functions acting on noemata. Noematic backgrounds can also be treated as functions. Then the relationship between the noematic backgrounds and the noematic perspectives can be formalized as a superposition of two functions. The results of such superpositions can be described as a functions of noematic character whose arguments would be noemata and their values would be mental worlds. Acting on the noematic perspectives, a background function would distinguish something from itself that would function as a semantic and ontological location in this background or, in other words, as a mental world distinguished in it. For example, the function of the reality background, which acts on a noematic perspective of the form: <closeness, homeliness, visibility, anti-valence>, understood as the “dark side of my privacy”, distinguishes a certain mental world in this background, filled with various objects (individuals, events, processes, states of affairs, situations, etc.) that appear to the mind in the actions of its stream of consciousness as simultaneously close to mine, visible and anti-valuable. The role that the noematic perspectives perform towards the noematic backgrounds, can be described as the stratification of the noematic backgrounds into the schemes of various mental worlds, which may be also treated as functions.

What is the mechanism of acting of noematic character functions? Functions of *NOESIS* activate appropriate functions of *NOEMA*, whose constituents are functions of noematic character understood as superpositions of functions of noematic backgrounds with functions of noematic perspectives. Functions of noematic character act on noemata, that is, on elements of the set *NM* defined in (DF9). They assign specific mental worlds (mental spaces) to the noemata. As a result of this process, a specific mental space is successively filled with various noemata. This means that noemata do not participate in intentional acts in an isolated way. Referring intentionally to any object through the use of noemata, the mind always places the objects of reference acts in specific mental worlds. For example, one cannot refer to a number

one in an isolated way, without placing it in a given arithmetic world among other numbers remaining in various relations with each other. Intentional acts carried out in the stream of consciousness intertwine with each other, creating intentional actions that take place among various mental worlds. In this sense, an intentional reference to any object is always a reference to this object in some mental worlds. There are no intentional non-world and non-contextual objects of reference acts.

Let *N-CHARACTERS* be the set of all functions of the noematic character. Let *N-BACKGROUND*, *N-PERSPECTIVES* and *M-WORLDS* be, respectively, sets of all functions of noematic background, functions of noematic perspectives and functions of all mental worlds (mental spaces).

$$(DF10) \quad (\forall g)[g \in N-CHARACTERS \equiv_{df} (\exists \alpha, \beta)[g = \alpha(\beta) \wedge \alpha \in NOEMA \wedge \beta \in NOEMA \wedge \alpha \in N-BACKGROUNDS \wedge \beta \in N-PERSPECTIVES]]$$

According to (DF10), functions of noematic characters are superpositions of functions from the set *N-BACKGROUNDS* with functions from the set *N-PERSPECTIVES* which also belong to the set of all functions of noematic synthesis. Because noemata may be represented as sequences of appropriate functions belonging, respectively, to sets: *GEN*, *PRED* and *AOPHANTICS*, and since noemata are arguments of functions of noematic characters, then one may adopt the following axiom which describes functions of noematic characters.

$$(A8) \quad (\forall f)[f \in N-CHARACTERS \rightarrow (\exists g_1, g_2, g_3, r, w)(g_1 \in GEN \wedge g_2 \in PRED \wedge g_3 \in AOPHANTICS \wedge r \in NM \wedge w \in M-WORLDS \wedge f(g_1, g_2, g_3) = \langle r, w \rangle)$$

According to (A8), values of functions belonging to the *N-CHARACTERS* are noemata in mental worlds represented formally as pairs composed of a given noema and an appropriate mental world.

According to the above-presented definitions, any function of noematic synthesis may be formalized as the complex function in the following way:

$$(DF11) \quad (\forall g)[g \in NOEMA \equiv_{df} (\exists \alpha, \beta)[g = [\alpha(\beta)](g_1, g_2, g_3) \wedge \alpha \in N-BACKGROUNDS \wedge \beta \in N-PERSPECTIVES \wedge g_1 \in GEN \wedge g_2 \in PRED \wedge g_3 \in AOPHANTICS]]$$

Because $[\alpha(\beta)]$ is a function belonging to the set *N-CHARACTERS*, the function $[\alpha(\beta)](g_1, g_2, g_3)$ described in (A8) produces structures of the shape: $\langle r, w \rangle$, where r is a noema (r belongs to the set *NM*) and w is some mental world (w belongs to the set *M-WORLDS*). The ultimate result of any function of noematic synthesis, entangled in an act of reference, falls under the structure of the following shape: $\langle \langle \langle x_1, \dots, x_i \rangle, \{ \langle d_1, y_1 \rangle, \dots, \langle d_p, y_p \rangle \} \rangle, \{ l, o, s \} \rangle, w \rangle$, where x_1, \dots, x_i are noematic poles, d_1, \dots, d_p are predicative determinations, y_1, \dots, y_p are values of satisfactions in predicate senses, $\langle \{ x_1, \dots, x_i \}, \{ \langle d_1, y_1 \rangle, \dots, \langle d_p, y_p \rangle \} \rangle$ is a noematic core, l, o, s form a formal apophantics of a given noema, comprising a logical theory, an ontology and some folk semantic theory, and w is a mental world. The set $\{ l, o, s \}$ functions as

“a software engine” of a noema which enables the mind to process it in cognitive actions.¹²

4 Concluding Remarks

Any reference function entangled in any act of intentional reference is a superposition of the function of noetic synthesis with the corresponding function of noematic synthesis. Both functions are complex structures connected by the relation of activation in such a way that a function of noetic synthesis activates a corresponding function of noematic synthesis. According to the formal model of functions belonging to *NOESIS*, described in the first part of the work, they take the following shape: $i(i(q,k),m)$, where i is a function of noetic intention, q is a cluster of qualia, k is a noetic mood, and m is a function of noetic mode. The functions of noematic synthesis, belonging to the set *NOEMA*, may be formalized as functions falling under the following shape: $[\alpha(\beta)](g_1, g_2, g_3)$, where α is a function of noematic backgrounds, β is a function of noematic perspectives and g_1, g_2, g_3 are, respectively, a function of generating predicate senses, a function of noematic predication and a function of apophantics. Hence, any reference function belonging to *REF* may be modelled as the complex structure of the shape: $i(i(q,k),m)[[\alpha(\beta)](g_1, g_2, g_3)]$, where $i(i(q,k),m)$ activates $[\alpha(\beta)](g_1, g_2, g_3)$.

Since each act of reference falls under the presented structure, its phenomenological description requires the specification of the nine components highlighted in the structure together with showing their mutual connections in the stream of consciousness. In the third part of the work, the current model will be applied to the field of speech acts, especially—locutionary and illocutionary acts. The main goal will be to show that the presented model explains the facts of misunderstanding in the communication processes.

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¹² If noemata are interpreted as memes in the meaning of this category created by Dawkins, then $\{l, o, s\}$ may be treated as software engine enabling memes to mutate into their various modifications in replication processes.

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