Non-Alethic Meinongian Logic

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Abstract. The purpose of this work is to provide an answer to two fundamental questions: 1) Can a non-alethic logic be a Meinongian logic? And consequently 2) Can a non-alethic logic be an adequate logic for a Meinongian theory of objects? Using the results of da Costa (1989) and da Costa & Marconi (1986) and furthermore of da Costa (1986 and 1993) I propose a minimal non-alethic logic of the first order with identity and Hilbert's ε-symbol (da Costa et al. 1992) which can bring into Meinongian spirit the most relevant aspects of Meinongian logic underlying Meinong's theory of objects. This is just a first approach of mine, to account for a complex thought, but so interesting, too as Meinong's thought. Furthermore, giving a positive answer to 1) and 2) I indicate a plausible way which can avoid both difficult approaches and the attempt to refuse the theory of objects in order to do not compromise standard logic and some of its own laws. My approach shows that Meinong's theory can be a valid ontology, because there is adequate and not banal logic underlying it.

Keywords: Objects, non-alethic, ε-symbol.

1. The theory of objects

A. Meinong makes a difference between the theory of objects and the metaphysics because this one deals with reality, as well as most of the disciplines except mathematics.

> With any kind of concern metaphysics deals with the total existence. But total existence, including what has existed and what is going to exist, is infinitely small in comparison with the totality of the objects of knowledge. (Meinong 1904: GA II: 486)

The theory of objects has also to be separeted from psychology because objects cannot be reduced only to the psychology of the subject.

Their extra-mental *objectivity* is the result of the fact that the subject addresses towards them his own mental activity. Already Brentano (Brentano 1924) suggested that mental event is addressed towards an object. In fact you don't *believe* generically, but you believes in something; you don't fear generically but you fears *something* or *somebody*.

Intentionality of mental event is exactly its addressing to an object. Each mental event is always addressed towards an object, defined *intentional object*. So intentionality makes a difference between physical objects and the mental ones.

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Twardowski (Twardosky 1894) explains better the problem, pointing out, in each mental event, the *act*, the *object* of the act and the *content* which addresses the act towards the object.

For example, if you thinks about the planet Venus, the *act* is thinking, the *object* of the act and the *content* could be "the morning star" or "the evening star".

From this distinction made by Twardowski, and accepted by Meinong, follows that you can think, for example, about Pegasus, distinguishing exactly the *act* of thinking, the *object* Pegasus, and the *content* — the winged horse. Brentano, in his first approach, (reads) the thesis of *intentionality*, concerning *problematic* objects such as "Pegasus" (non-existing or singular terms non-denoting) as having a purely *immanent* existence, inside the mind; this way will be followed also by B. Russsell, in polemic with Meinong, (Russell 1973) and (Grana 2004), they *in-exist*, they exist in the mind. So according to Brentano the contents are subjective entities, their existence depends on psychical events which happen in the mind of the subject. Meinong's contents, developing Twardowski, are the elements that concretely address the act towards its object and that change following the object changes.

"Object is all that can be an intention of thought, being it existent, possible or impossible thinking" (Lenoci 1972: 297).

For the object "its intrinsic peculiarities are essential, they have a value independently from every statement of being, so that of each object (even of the impossible ones) one can predicate its essential peculiarities" (Lenoci 1972: 297).

It means that it's possible to build up a science free from existence judgements, a priori. The experience, from which all data are known, doesn't found the links between objects and their properties, as in the empirical knowledge, a posteriori (Lenoci 1972: 297).

The contents, according to me, can be compared with Frege's *Sinne* (Frege 1892), that is as *Bedeutung*. In the previous example, when you think about planet Venus, the *Sinne* are "the morning star" and/or "the evening star", while the *Bedeutung* is "Venus".

Anyway, the problems bring up for what concerning objects such as "Pegasus", "the golden mountain", "the chimera", "Homeric gods", "the round square", etc., because we use the principle of uniformity of thought and language (Rapaport 1978) whether concerning what exists or concerning what doesn't exist. It means both when you think about an existing object and when you think about a non-existing object you are in relation with an *intentional object*, because you are thinking about it: we speak about it in the same way. Meinong accepts the thesis of *intentionality* (it doesn't matter if the object exists or not) because, if you think about *something* that doesn't exist, you have in any casa suppose this "*something*". If you judge that "the round square" doesn't exist, you presuppose it, that's what exactly happens (Meinong 1904).

Meinong distinguishes objects in *concrete objects* (*Objekte*), for example animals, tables, mountains, etc., and *ideal objects*, for example equality between 3 and 3 or the difference between red and green.

Among ideal objects there are the objectives (*Objektive*), extra-mental entities towards which mental activity is addressed. So the *Objekt* is the object of representation, the *Objektiv* is the object of judgement and of assumption. For example, Naples is beautiful. The *Objekte* are Naples and beauty, the meaning of the terms "Naples" and "beautiful" of the proposition "Naples is beautiful", while the *Objektiv* corresponds to the fact (*Tatsache*) that *Naples is beautiful*. *Judgement* is the presence of the assertive moment or of conviction. *Assumption* lacks this presence, that is it's a judgement without conviction (Meinong 1910). What brings them together is the object, that is the objective, expressed by the proposition "Naples is beautiful", that *Naples is beautiful* (Meinong 1910). Since it's made of objects it's an object of a superior order. Objectives are complex entities, they are made of simple entities and can be or not be, they are of a superior order, because they ontologically presuppose their constituents. For example, "Paris is crowded" is an entity in itself, but its reality depends from the objects (*Objekte*) of the inferior order such as Paris and *crowded*, which are the meaning of the terms "Paris" and "crowded".

While the *Objektiv* is given by *Paris is crowded*. The concrete objects are existent (Paris, Mario, Socrates) or they are non-existent (Pegasus, The golden Mountain). Ideal non-existent objects, for example false objectives, and concrete non-existent objects (the possible ones, as the Golden Mountain and the impossible ones such as the round square) have a lack of being.

Meinong admits the *Objektive* (objectives) which do not subsist, in the case of false judgement or in that of the true negation (Meinong 1910). Between judgement and assumption Meinong distinguishes a *thetic* function of thought and a *synthetic* function (Meinong 1910).

Thetic function allows thought to comprehend *Sein*, that we can indicate as the *Objektiv* of being (*Seinsobjektiv*); synthetic function allows to comprehend a *Sosein*, so-being, indicated as the *Objektiv* of so-being (*Soseinobjektiv*).

Furthermore, Meinong speaks about *Quasisein*, quasi-being (Meinong 1904), attributable to objects lacking being. If the relation between *Objektiv* and *Objekt* was also analogous to that one between the part and the whole, in the sense that, if there is the whole, there must also be the part, so, if there is the *Objektiv*, there must also be the corresponding *Objekt*, this would bear difficulties. In fact given the judgement, or the assumption, that "*A* is not", being (the existence) would belong also to the meaning of such a judgement to "the non-existence of *A*"; but the *Objektiv* denies precisely the existence of *A*, being that we have said we can consider in two ways, as existence and as subsistence. So far the necessity of a being of the *Objekt* of the *Objektiv* can be satisfied only by a being which is not existence and neither subsistence. So we should add to both spheres a third one, corresponding to a type of being which should belong to each object, because it hasn't to face a non-being.

We can define this type of being *Quasisein* (Meinong 1904).

So if a certain x has no being, the objective that asserts the non-being of x subsists — between an objective and its constituents there is a relation similar to that between the parts and their whole, therefore if the whole is, its parts must be, too. *Quasisein* is read by Meinong as a certain sphere of being, in which we presuppose the object to be given in a way or another, anyway without satisfying neither an *existence* neither a *subsistence*, that is behind them (Meinong 1904). To this object would belong a common being as to any other object, of the type that will not have a non-being. Meinong, to avoid confusion, introduces the term *Außersein*, extra-being, for this being of the object (not existent and not subsistent) which the common denominator of all objects we can speak of. Therefore, an object is first of all out of being and not being: "The object due to its nature is out of being, though of its two objectives of being, its being or its not being, one is going to subsist anyway" (Meinong 1904: 494).

So the object shows itself purely and for this reason we can later speak of it, we can attribute it being or not being.

Meinong doesn't suggest each so-being presuppose a being and admits the possibility to analyse and attribute properties to non-existent objects. The independence of *Sosein* from *Sein* justifies what we have already written, that is "what isn't anyway exterior to the object, rather makes its own essence, consist in its so-being, which adheres to the object, which is or is not" (Meinong 1904) [*dasjenige, was dem Gegenstande in keiner Weise äußerlich ist, vielmehr sein eigentliches Wesen ausmacht, in seinem Sosein besteht, das dem Gegenstande anhaftet, mag er sein oder nicht sein*] (Meinong 1904: 494).

If a table does not exist there is no sense to speak about it as being small or big. But, for example, of a geometric figure, which does not exist, we study, we analyse and we verify its properties, that is its so-being. The so-being of an object is not affected by its non-being, there is independence of so-being from being and this regards both the objects which does not exist, and those which cannot exist, because impossible. "Not only the so celebrated golden mountain is of gold, but also the round square is so certainly round as square" [*Nicht nur der vielberufene goldene Berg ist von Gold, sondern auch das runde Viereck ist so gewiß rund als es viereckig ist*] (Meinong 1904: 490).

In fact Meinong specifies that "in order to know that there is no round square, I must just make a statement about the round square", that is I must admit that "there are some objects, due to which similar objects don't exist" (Meinong 1904: 490) [*Um zu erkennen, daß es kein rundes Viereck gibt, muß ich eben über das runde Viereck urteilen (...) es gibt Gegenstande, die es nicht gibt*].

In other words we could say that "there are (pure) objects due to which similar (real) objects do not exist".

About those objects we can express true propositions, because we do not attribute *being* but so-being.

So we can speak of the so-being of an object, that is of its properties (determinations), evading, neglecting their being. There is independence between *so-being* and *being*. To get free "from the subject of the statement of existence involves that each object can be subject in a judgement, and that about each one we can express true statements, because the opposition between being and not being is a matter that belongs to the *Objektiv* and not to the *Objekt*, so in the object (*Gegenstand*) regarded for its sake there isn't neither being nor non-being" (Russell 1973: 99).

If we admit that a certain thing does not exist, we presuppose that the thing (not its representation) *in some way is* without a prejudice about the possibility of its non-being.

"The problem of being and non-being stands only because the object is in an absolute *way*, otherwise of what absolutely is not we cannot even speak" (Raspa 1999: 245).

Some critics are right, at least in this occasion, to quote Plato: "But what is not, what else can be, if not that "is it not"? — "it is not". And what is not, what else can be if not absolute not being? — Absolute not being!" (Platone 1984). Maybe in other places Platonism attributed to Meinong is forced, but here we must agree. So, if I can speak of something then in such a way it must be. But what means *to show itself* of the object if it is not? If the predicate implies the existential being, then also an impossible predicate, such as "round and square" must imply the existence of the object (Raspa 1999: 245).

And what means for the object *to show itself* in the case it's incomplete? Meinong distinguished (Meinong 1906) two meanings of the term *existence*: the participle existent and the predicate "exists". This distinction allows to admit that the existent round square does not exist (Orilia 2002).

Russell doesn't accept this distinction, reading, after all, particular quantification *existentially*, as Quine will do. "I must confess I don't see any difference between exist and being existent, and beside this I have nothing else to say about this point" (Russell 1973: 99). While Meinong from this distinction admits that the existent of the round square does not exist "'existierend sein' in jenem Sinne der Existentialbestimmung und 'existieren' im gewöhnlichen Sinne von 'Dasein' ist eben durchaus nicht dasselbe" (Meinong 1904). Furthermore, the law of non contradiction, as the law of the third excluded aren't necessarily valid out the realm of being and possibility. So Meinong individuates a dominion in which these laws are not valid, and also Vasil'ev will admit it, he'll distinguish two fields, the ontological one where laws will change and the metalogical one where laws are invariable. The third excluded and the law of non contradiction are present in some ontological fields, so they can or cannot be valid, but not in the metalogical one. In this field unchangeable laws are other than these, for example, auto-contradiction (there is no chance that a proposition can be true and false at the same time), identity, sufficient reason. To Russell there is nothing more than his "On Denoting", by means of which he thinks to resolve radically and definitively this problem (Grana 2004). I think "On Denoting" cannot be just the ultimate possible answer and at last this work of mine is an effort to account for what Meinong admits and to show that his theory of objects cannot be easily set aside.

2. On a minimal non-alethic logic

Meinong's theory of the objects includes either inconsistent objects, that is contradictory. or incomplete objects, which do not have any property (law) or its negation.

A paraconsistent logic can be a good candidate dealing with inconsistent objects, but it cannot deal with incomplete objects.

Vice versa, a paracomplete logic (da Costa and Marconi 1986) can be a good candidate dealing with incomplete objects, but it cannot deal wit inconsistent objects.

A fuzzy logic could be an adequate logic, unfortunately, because of its nonmonotonicity characteristic, it has deducibleness problems.

It is to be consider more adequate for its common reasoning; it is in fact studies and used a lot in AI area.

I am thus proposing, as a first approximation, a non-alethic logic, that is to say paraconsistent and paracomplete at the some time, minimal according to da Costa's (da Costa 1989) non alethic proposal, with Hilbert's operator ε.

2.1. Non-alethic logic was introduced in da Costa (da Costa 1989). In this kind of logic the principles of tertium non datur and of contradiction are not valid; furthermore, non-alethic logic constitutes a generalization of both paraconsistent and paracomplete logics.

2.2 The primitive symbols of $\mathscr{A}$ are the following:

(a) Propositional variables (an infinitely denumerable set of variables);
(b) The connectives: $\rightarrow$ (implication), $\wedge$ (conjunction), $\vee$ (disjunction), and $\neg$ (negation); equivalence, $\longleftrightarrow$, is defined as usual.
(c) Parentheses: (,),

We define formulas, eliminate parentheses etc., as in Kleene 1952. Capital Latin letters will always stand for formulas, and capital Greek letters for sets of formulas.

The postulates (axiom schemes and primitive rule of inference) are the following, where A° is an abbreviation for $\neg(A \wedge \neg A)$, and A^* is an abbreviation for $A \vee \neg A$:

1. $(A \to B) \to ((A \to (B \to C)) \to (A \to C))$
2. $A \to (B \to A)$
3. $A, A \to B \ / \ B$
4. $A \to (B \to (A \wedge B))$
5. $A \wedge B \to A$
6. $A \wedge B \to B$
7. $A \to A \vee B$
8. $B \to A \vee B$
9. $(A \to C) \to ((B \to C) \to (A \vee B \to C))$
10. $((A \to B) \to A) \to A$
11. $A^* \wedge B^\circ \to ((A \to B) \to ((A \to \neg B) \to \neg A))$
12. $A^* \to (\neg\neg A \to A)$
13. $A^\circ \to (A \to \neg\neg A) \to (A \to (\neg A \to B))$
14. $A^\circ \wedge B^\circ \to ((A \to B)^\circ \wedge (A \wedge B)^\circ \wedge (A \vee B)^\circ \wedge (\neg A)^\circ)$
15. $A^* \wedge B^* \to ((A \to B)^* \wedge (A \wedge B)^* \wedge (A \vee B)^* \wedge (\neg A)^*)$

Def. $\sim A \ =_{\text{df}} \ A \to \neg A \wedge A^\circ$

When the propositional variables of a set of formulas satisfy the principle of tertium non datur, $A \vee \neg A$, for this set of formulas is valid the calculus C_1 (cf. da Costa and Marconi 1986), which is paraconsistent. On the other hand, if the propositional variables of a set of formulas satisfy the principle of contradiction, $\neg(A \wedge \neg A)$, then for this set of formulas is essentially valid the calculus P_1 (da Costa and Marconi 1986).

A possesses several interesting properties, for instance, the following:

1) In $\mathscr{A}$ all rules and valid schemes of classical positive logic are true (we have, for example: if $\Gamma, A \vdash B$, then $\Gamma \vdash A \to B$; if $\Gamma, A \vdash C$ and $\Gamma, B \vdash C$, then $\Gamma, A \cup B \vdash C$; $A, B \vdash A \wedge B$)).
2) $\mathscr{A}$ is not decidable by finite matrices.
3) If $\Gamma \vdash A$ is true in the classical propositional calculus, $\Gamma^\circ = \{\gamma^\circ : \gamma$ is a propositional variable occurring in a formula of $\Gamma\}$, and $\Gamma * = \{\gamma^* : \gamma$ is a propositional variable occurring in a formula of $\Gamma\}$ then $\Gamma, \Gamma^\circ, \Gamma^* \vdash A$ in *A*.
4) In $\mathscr{A}$ the strong negation "$\sim$" has all properties of classical negation.
5) In $\mathscr{A}$ the schemes $A \to (\neg A \to B), \neg A \to (A \to B)$, $A \wedge \neg A \to B$, $(A \leftrightarrow \neg A) \to B$, $A \vee \neg A$ and $\neg(A \wedge \neg A)$ are not valid.
6) $\mathscr{A}$ has a nice semantics of valuations.

So $\mathscr{A}$ is both a paraconsistent and a paracomplete logic.

2.3 The postulates of $\mathscr{A}_M^=$ are those of $\mathscr{A}$, plus the following:

I. $\forall x A(x) \to A(t)$, where t is a term free of x in $A(x)$, of the same sort as x if x is of the first sort and either of the first or second sort if x is of the second sort.
II. $\forall x(A \to B(x)) \to (A \to \forall x B(x))$, where x is not free in A.
III. M.P.
IV. Generalization $A(x)/\forall x A(x)$
V. Postulates for $=$. If t_1 and t_2 are terms, then:
$t_1 = t_1$
$t_1 = t_2 \to (F(t_1) \to F(t_2))$

Where the usual restrictions apply (they will not be made explicit in what follows).

The ε-symbol. ε.

VI. ε-axioms
$\varepsilon x F(x) = \varepsilon y F(y)$.

Where x and y are of the same sort:

$\forall x(F(x) \longleftrightarrow G(x)) \to \varepsilon x F(x) = \varepsilon x G(x)$;
$\exists x F(x) \to \forall x(x = \varepsilon x F(x) \to F(x))$;
$\neg\exists x F(x) \to \varepsilon x F(x) = \varepsilon x(x \neq x)$;
$\forall x(F(x) \to \exists y(y = x)) \to \varepsilon x F(x) = \varepsilon z F(z)$:
Where x is a variable of the second sort and y and z are variables of the first sort.

Remark

The ε-symbol is the Hilbert symbol (da Costa, Doria, Papavero 1992).

We can informally clarify the meaning of ε with an example.

If Q is a grade 1 predicate symbol and x is a variable, then $\varepsilon x Q x$ denotes such on x object that x possesses the Q property, or whatever permanent object, if there isn't any objects possessing the Q property. Hilbert symbol is so named "indefinite descriptor", to allow us to refer to an object of the dominion which has got a property, without precisely knowing what this object is.

More generically: ε is applied to formulas to form terms and the terms refer to the objects.

Terms and formulas are defined in the usual way, but we notice that given a predicate symbol of rank n, say, P, then $P(t_1, t_2 \dots t_n)$ will be a formula for all kinds of terms t_i, $1 \leq i \leq n$.

The ε-term $\varepsilon x F(x)$ is a term of the first (second) sort if x is a variable of the first (second) sort. The syntactical notions and notations are clear from the context.

Capital (small) Latin letters stand for formulas (terms). A sentence is a formula without variables.

The intuitive meaning for the language L of $\mathscr{A}_M^=$ goes as follows: we have two nonempty domains D_i, $i = 1.2$.

Terms of the first (second) order refer to members of D_1 (D_2) and the valid sentences of $\mathscr{A}_M^=$ should be true according to any interpretation of L in any pair ($D_1.D_2$)of domains such that $D_1 \subset D_2$.

$\mathscr{A}_M^=$ is either paraconsistent or paracomplete. If we introduce in $\mathscr{A}_M^=$ a strong negation "$\sim$"

$$\sim A =_{\text{df}} A \to \neg A \wedge A^\circ$$

We thus have:

Theorem 1. *The symbols $\to$, $\wedge$, $\vee$, $\exists$, $\forall$, ε, $\sim$ of $\mathscr{A}_M^=$ have all properties of the corresponding classical connectives (operator)*

Theorem 2. *$\mathscr{A}_M^=$ is a conservative extension of $\mathscr{A}$.*

Remark

$\mathscr{A}_M^=$ is either paraconsistent or paracomplete, that is to say, non-alethic, as Mirò Quesada said talking about a logic which doesn't satisfy neither the non contradiction law in general non the law of excluded weight in general.

That is to say a logic which considers either the inconsistency or the lacuna (incompleteness).

We then define the concept of deduction in the usual way, as well as the symbol $\vdash$. Then, as a result, the standard theorems of classical first-order logic remain true: the deduction theorem, proof by cases, replacement of equivalents and so on we can define the symbol $\vDash$ of semantic consequence.

Theorem 3. *Let $\Gamma \cup \{A\}$ be a set of sentences of $\mathscr{A}_M^=$ then $\Gamma \vdash A$ if and only if $\Gamma \vDash A$.*

Theorem 4. *The semantics of valuation of A can be extended to $\mathscr{A}_M^=$ We build in that way a new system $\mathscr{A}_M^=$ which allows us to deal with objects such as*

$$\varepsilon x(P(x) \wedge \neg P(x))$$

Where P is a monadic predicate symbol.

In other words, $\mathscr{A}_M^=$ does not *ab initio* exclude *contradictory* objects.

In $\mathscr{A}_M^=$ you can treat incomplete objects. Obviously, compared to a strong negation, $\sim$, in $\mathscr{A}_M^=$ it is not possible treating with formula:

$$\varepsilon x(P(x) \wedge \sim P(x))$$

Definition 1. $\iota x F(x)$ is an abbreviation for

$$\varepsilon x(\exists!\, F(x) \wedge F(x)).$$

ι is the symbol for definite descriptions, which ε is the symbol for indefinite descriptions.

Theorem 5. *Under similar restrictions as those in the ε-postulates, the following formulas are valid in $\mathscr{A}_M^{=}$:*

$$\iota x F(x) = \iota y F(y),$$
$$\iota x(F(x) \leftrightarrow G(x)) \rightarrow \iota x(F(x) = \iota x G(x)),$$
$$\exists! x F(x) \rightarrow \forall x(x = \iota x F(x) \rightarrow F(x)),$$
$$\neg\exists! x F(x) \rightarrow \iota x F(x) = \varepsilon x(x \neq x),$$
$$\forall x(F(x) \rightarrow \exists y(x = y)) \rightarrow \iota x F(x) = \iota z F(z).$$

Proof. Consequence of the ε-postulates. □

Remark

$\mathscr{A}_M^{=}$ does not provide, like in Paśnicsek (Paśnicsek 1998, 2002) a version based on two different types of predication, interior and exterior, where a kind of layer construction of the Meinong objects is provided; according to which these objects could never possess, in a very genuine exteriority, some properties interiorly possessed which involve an exterior predication. The Meinongian objects generating paradoxes are thus excluded by the ontological inventory, while in $\mathscr{A}_M^{=}$ these are not excluded from the start, so the logic is not banal one. The non-alethic negation is unique either for the propositional dimension or for the predicative one. (Just see *consequentia mirabilis*). The classical negation is recuperated and the other operators are closed, compared to the classical calculus of firts order with identity.

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Resumo. O propósito deste trabalho é fornecer uma resposta a duas questões fundamentais: 1) pode uma lógica não alética ser uma lógica meinongiana? E consequentemente 2) pode uma lógica não alética ser uma lógica adequada a uma teoria meinongiana dos objetos? Usando os resultados de da Costa (1989) e da Costa & Marconi (1986) e além disso de da Costa (1986 e 1993), proponho uma lógica minimal não alética de primeira ordem com identidade e o símblo ε de Hilbert (da Costa et al. 1992) que podem colocar em um espírito meinongiano os aspectos mais relevantes da lógica meinongiana subajcente à teoria dos objetos de Meinong. Esta é apenas uma primeira abordagem minha, para dar conta de reflexões complexas, mas também interessante como o pensamento de Meinong. Além disso, dando uma resposta positiva a 1) e 2) indico um modo plausível que pode evitar ambas as difíceis abordagens e a tentativa de recusar a teoria dos objetos de modo a não comprometer a lógica padrão e algumas de suas leis. Minha abordagem mostra que a teoria de Meinong pode ser uma ontologia válida, porque há uma lógica adequada e não banal subjacente a ela.

Palavras-chave: Objetos, não alético, símbolo ε.