Non-Standard Neutral Free Logic, Empty Names and Negative Existentials

by Dolf Rami

King's College London / University of Göttingen

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[*Please do not quote without contacting me first:* dolf.rami@kcl.ac.uk]

ABSTRACT – The aim of this paper is to evaluate the correctness of a semantic analysis of existential sentences containing proper names as its grammatical subject that make use either of a negative or a neutral free logic as semantic framework. I will try to show that a specific version of neutral free logic has important advantages over its standard negative free logic rival. In the first section of the paper I will set the task of the analysis in more explicit terms. Secondly, I will outline on the basis of a clash of semantic intuitions what is in my opinion the essence of the stubborn philosophical problem of the analysis of singular existential sentences. In the third section, I will give a short overview of current popular solution-strategies to our problem. Fourthly, I will briefly sketch the semantics of standard negative free logic and unrestricted neutral free logic. In the fifth section, I will present two motivations for a solution to our initial problem based on a negative or neutral free logic. The last section will contain a discussion and evaluation of objections that have been cited against negative and neutral free logic. The upshot of this discussion will be a defence of a certain non-standard neutral free logic.

1. Proper Names and Negative Existential Sentences

Proper names can be used in natural languages in a great variety of sentential contexts. They can, for example, be used in positive and negative singular existential sentences. A positive singular existential sentence has the grammatical form 'n exists'; a negative the form 'n does not exist', if we conceive of 'n' as a schematic letter for singular terms. There are other singular terms than proper names that can be substituted for 'n' to form a meaningful sentence, but I will concentrate my attention on singular existential claims that only contain proper names.

The use of proper names in these existential contexts poses a serious and delicate problem for any conception concerning the semantics of proper names. Competent speakers of English have the shared intuition that there are true and false negative and positive singular existential sentences that contain proper names only. They also accept that a large number of these sentences are contingently true or false. Famous examples of negative existential sentences that contain proper names and are intuitively conceived of as true are:

(E1) Vulcan does not exist.

(E2) Pegasus does not exist.

(E3) Sherlock Holmes does not exist.

These intuitions about the truth-values of positive and negative singular existential sentence pose a problem, because it seems to be extremely difficult to account for these intuitions on the basis of standard assumptions about the semantics of proper names and existential sentences.

2. Four inconsistent assumptions concerning negative existential sentences

In my opinion, the best way to formulate this problem makes use of four different intuitive assumptions, which are highly plausible if they are considered in isolation, but are insofar incompatible as they cannot be jointly true. Explicitly we can formulate these four jointly inconsistent assumptions in the following way:

(*The Truth-Value-Thesis*)

Some sentences of the grammatical form 'n does not exist' that contain a proper name are true.

(*The Logical-Form-Thesis*)

Every sentence of the grammatical form 'n does not exist' that contains a proper name is a sentence of the logical form '¬E!a'.

(*The Truth-Condition-Thesis*)

Every sentences of the logical form '¬E!a' is true iff ‘E!’ designates the set E* and ‘a’ designates the object a* and a* is not an element of E*.

(*The Connection-Thesis*)

Every instance of the schema '(∃x('n' designates x) → n exists)'[1] is true.

[1] We can alternatively use the following schema (+) for the same purpose: '('n' designates n → n exists)'.

The Truth-Value-Thesis is a direct consequence of the mentioned intuitions of competent speakers concerning the truth-values of positive and negative existential sentences that contain proper names. The Logical-Form-Thesis assigns to negative existential sentences that contain a proper name not only the simplest plausible logical form, but also a logical form that is most near to the grammatical surface structure of such sentences. The Truth-Condition-Thesis outlines the standard account for truth-conditions of negated singular predications on the basis of classical predicate logic. The Connection-Thesis draws attention to a very plausible and intuitive necessary connection between semantic reference and existence.

Our philosophical problem now consists in the following: Each of these four theses seems to be plausible in its own right; nevertheless they cannot be accepted jointly, because of their inconsistency. Their inconsistency can be shown as follows. Let us assume that the sentence 'Vulcan does not exist' is true. According to the Logical-Form-Thesis this sentence is a sentence of the logical form '¬E!a'. The Truth-Condition-Thesis has the consequence that if a sentence of this form is true, then the individual constant 'a' designates something. But now the Connection-Thesis says that if the individual constant 'a' designates something, then a exists. 'a exists' in our case says the same as 'Vulcan exists' and so it is the case that Vulcan exists. But if our assumption is correct that 'Vulcan does not exist' is true, then Vulcan does not exist. Therefore, our initial assumption leads on the basis of the application of the Logical-Form-Thesis, the Truth-Condition-Thesis, the Connection-Thesis and the truth of the instances of the following plausible truth-theoretic schema:

(TS→) If x is true (and x expresses the proposition that p), then p,

to a contradiction. A solution to this problem either requires an explanation why this inconsistency is only apparent and can be explained away *or* the rejection and substitution of at least of one of the four listed assumptions. In my opinion, the instances of (TS→) should not be added to the claims that are at disposition, because they are no essential component of the outlined problem.[2]

[2] They become superfluous if we reformulate the Connection-Thesis in the following cumbersome way: For every n: (∃x('n' designates x) → 'n does not exist' is not true).

3. Five solution strategies to our problem concerning negative existential sentences

Philosophers have proposed a variety of different solution strategies to our problem. In this section I will briefly outline five of these strategies. In my opinion these strategies cover the most recent and most plausible accounts to solve our problem.

According to *strategy A* the falsity of *the Truth-Value-Thesis* is the main source of our problem. There are at least two different versions of this strategy. The first version of strategy A locates the error why we falsely believe that *the Truth-Value-Thesis* is true in an erroneous intuitive conception concerning the semantics of sentences like (E1)-(E3).[3] The second version holds that we erroneously believe that *the Truth-Value-Thesis* is true because we conflate the literal content of a sentence like (E1)-(E3) with the content that such a sentence may pragmatically convey.[4] [5]

Strategy B regards *the Logical-Form-Thesis* as the main source of the mentioned incompatibility. There is a large number of different accounts of this variety. Let me just mention one prominent versions of this kind: Russell's solution. Russell has claimed that the correct logical form of sentences like (E1)-(E3) is represented by certain rather complex quantificational formulas. Namely, quantifications of the following logical form: $\neg\exists x(Fx \wedge \forall y(Fy \rightarrow x=y))$.[6] Such an analysis is committed to some version of the so-called description theory of proper names.

Strategy C holds that the rejection of *the Truth-Condition-Thesis* is the key to a solution to our problem. This solution can be defended in different versions. Let me mention one prominent version here. According to Sainsbury, a sentence like (E1) has the proposed logical form, but the truth-conditions of such a sentence are provided by a certain bivalent negative

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[3] We may, for example, think that 'Sherlock Holmes' designates an abstract object and that 'exists' expresses a property with a non-empty anti-extension (= the complement of the extension of the property), while in fact 'Sherlock Holmes' is an empty name and 'exists' expresses a property with a necessarily empty anti-extension. A solution to our problem based on this estimation is defended in: Reimer (2001, 498-501).

[4] This strategy is defended in: Adams and Stecker (1994).They hold the view that sentences like (E1) are literally neither true nor false, but pragmatically convey true descriptive singular negative existential propositions.

[5] There seem to be at least three different ways to defend the first version of strategy A. According to the first and most radical variant sentences like (E1)-(E3) are meaningless; the second variant holds that they are literally neither true nor false; and the third that these sentences are literally false. The second version of strategy A can, in my opinion, only be defended in two ways, these ways correspond to the second and third mentioned way of defense of the first version of strategy A. (A solution based on the claim that sentences like (E1)-(E3) are neither true nor false also requires the rejection of *the Logical-Form* or *the Truth-Condition-Thesis* or both.)

[6] C.f.: Russell (1918-19). Alternative versions of strategy B are defended in Kripke (1973); Evans (1984, 369-372); Fitch (1993, 469) and Katz (1994, 23-24).

free logic.[7] On this basis atomic sentences that contain at least one empty individual constant are conceived of as false.[8]

S*trategy D* identifies *the Connection-Thesis* as the main source of our problem. This strategy can be called *Meinongian* solution to our problem.[9] There are at least two different versions of Meinongianism, both versions claim that the predicate 'exist' expresses a first-order discriminating property.[10] Only the second version also holds the view that the primary universal and the primary particular quantifier have no existential import and quantify over both existent and non-existent objects. It is, therefore, possible do define a secondary particular quantifier with existential import on the basis of the primary particular quantifier and the existence predicate or a restriction of the domain to existent things. Therefore, according to the first version of the Meinongian solution *the Connection-Thesis* is plainly false. According to the second version, it is ambiguous and has a false and a trivially true reading, because of two possible interpretations of the particular quantifier that *the Connection-Thesis* contains.[11] This leads to a solution to our problem, because only on the basis of the rejected reading of *the Connection-Thesis* the mentioned incompatibility obtains.

The last solution strategy I want to mention here is *strategy E*. This strategy does not solve the problem by rejecting any of the mentioned four assumptions, it rather claims that the whole problem is based on an equivocation concerning the natural language expression 'exist' and can be dissolved by drawing a distinction. *Strategy E* says that 'exist' is an ambiguous expression. According to it there is a logical notion of existence relative to which *the Truth-Value-Thesis* is false and there is an ontological notion of existence relative to which *the Connection-Thesis* is false.[12]

It is not the aim of this paper to show which of these strategies are implausible or hopeless and which in fact work in a specific version. My aim is a bit more moderate. Firstly, I aim to present two different kinds of reasons that favour a solution that makes us of negative or neutral free logic in combination with *strategy C* over any other mentioned solution if they

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[7] C.f.: Sainsbury (2005, 69-75; 86-97, 202-209). A similar view is defended in Braun (1993, 460-465).
[8] An alternative version of this view is defended in: Salmon (1998, 280-281, 309).
[9] Different versions of this solution are defended in: Parsons (1980); Zalta (1983); Priest (2005).
[10] A non-discriminating property is a property with a necessarily empty anti-extension.
[11] If we make use of schema (+) to formulate our problem, then this schema has false instances according to the Meinongian solution.
[12] In Williamson (2002, 244-245) this solution is not explicitly endorsed, but one could use the views expressed in this paper by Williamson to defend a version of strategy E. Williamson there claims that 'a exists' in the logical sense means the same as '$\exists x(a=x)$' and in the ontological sense it means the same as 'a is concrete'. A similar line of defence is outlined in Salmon (1998, 293) and Soames (2002, 89-95).

are accepted. Secondly, I want to demonstrate that a certain non-standard version of neutral free logic provides a plausible framework for our purpose than standard negative free logic. But before I will do this, I will outline the most well-known versions of negative and neutral free logic.

4. Negative and Neutral Free Logic

There are different kinds of free logic and different ways to distinguish these kinds, but only certain variants suit the purpose of a defence of our *strategy C*.

Firstly, we can distinguish versions of a free logic on the basic of the general semantic framework they use. So we can distinguish a *dual* from a *non-dual* free logic.

A dual free logic makes use of two different domains of discourse: a so-called outer domain and an inner domain. The inner domain might possibly be empty the outer domain not. Every object that is an element of the inner domain is also an element of the outer domain, but not the other way round. The quantifiers only range over the inner domain. The objects assigned to the individual constants can be elements of both domains.

A non-dual free logic makes just as classical predicate logic only use of one domain of discourse, but with the yet mentioned differences concerning classical predicate logic. In this paper I will only consider kinds of free logic that make use of a non-dual semantics. I aim to defend a solution to our initial problem that that tries to account for the meaningfulness of empty proper names and this can only be done on the basis of a non-dual free logic.

Secondly, a non-dual free logic can be defended in two different versions. The semantics of classical predicate has two features that a free logic may question and reject. Firstly, it is committed to the thesis that necessarily, the domain of discourse is a non-empty set; secondly, to the claim that necessarily, interpretations are functions and therefore assign to every individual constant an object of the domain of discourse.[13] We can distinguish on this basis two versions of a non-dual free logic. A *universally free logic* is a logic that rejects the first claim and therefore allows the possibility of an empty domain of discourse. As a consequence of this rejection an interpretation must be possible that assigns no objects to the used individual constants. We have to treat the interpretation function on this basis as a

[13] If we only make use of one domain of discourse, a rejection of the first claim has the rejection of the second claim as consequence, but not the other way round.

partial function. A *non-universally free logic* treats the interpretation function as a partial function, but rejects the possibility of an empty domain of discourse.

Concerning logical truths, the acceptance of both mentioned claims and the acceptance of standard semantics of classical predicate logic has the consequence that the following formulas of predicate logic come out as logical truths:

(E4) $\exists x(Fx \vee \neg Fx)$

(E5) $\exists x(x=a)$

If we substitute the interpretation-function of classical predicate logic with a partial interpretation-function, (E4) but not anymore (E5) comes out as a logical truth.[14]

The third and most important dimension of distinction concerns the logical type of a free logic and some related more specific differences concerning the specific semantics of such a free logic. Commonly, three different *semantic* types of free logic are distinguished: positive, negative and neutral free logics. If we focus on the *logical* type of such logic, we can distinguish bivalent, from three-valued and supervaluationist versions of free logic. Neutral free logics are typically three-value logics. The dual-standard version of positive free logic is a bivalent logic as the standard version of negative free logic. More recently also supervaluationist versions of free logic have been developed.[15]

The difference between positive, negative and neutral free logics mainly concerns different possible modifications of the truth-conditions of classical predicate logic for atomic sentences. A *positive free logic* makes it possible that there are some atomic sentences that are true, although the individual constants that such a sentence contains do not denote or denote individuals that do not exist. According to *negative free logic*, every atomic sentence that contains at least one non-denoting individual constant is false. Concerning *neutral free logic* we have to distinguish two different variants, namely unrestricted and restricted variants. According to an unrestricted neutral free logic *every* formula that contains at least one non-denoting individual constant is neither true nor false. According to a restricted version only *some* formula that contains at least one non-denoting individual constant are neither true nor false.

[14] A corresponding distinction can be drawn for dual free logics. A logic based on a dual domain semantics is only then a free logic if it only contains quantifiers that range over the inner domain. Against this background (E5) does not hold if the interpretation-function also assigns objects from the outer domain to the used constants. A dual free logic is universally free if it is possible that the inner domain is empty.

[15] C.f.: Bencivenga (1986).

If one aims to defend solution *strategy C* on the basis of the framework of free logic only variants of negative and neutral free logic can be used for this purpose. The two most prominent and widely discussed versions of negative and neutral free logic might be called *standard negative free logic* and *unrestricted neutral free logic*. Both of these logical languages are universally free. I will now outline the semantics of this two logics, because the will constitute the background for our discussion of standard objections against negative or neutral free logic.

Standard negative free logic is a bivalent first-order predicate logic with identity. It shares many features with classical first-order predicate logic with identity. The main differences concern (a) the possibility of an empty domain of discourse, (b) the interpretation-function that is conceived of as partial function[16] and (c) the semantics of atomic sentences.

Contrary to classical predicate logic standard negative free logic assigns the following truth- and falsity-conditions to standard atomic sentences and to atomic sentences that contain the logical predicate of identity:

A.1. Atomic Sentences

$V(Pt_1 \ldots t_n) = T$ iff $I(t_1), \ldots, I(t_n)$ are designated and $<t_1,\ldots,t_n> \in I(P)$

$V(Pt_1 \ldots t_n) = F$ iff it is not the case that($I(t_1), \ldots, I(t_n)$ are designated and $<t_1,\ldots,t_n> \in I(P)$)

A.2. Identity Sentences

$V(s=t) = W$ iff $I(s)$ and $I(t)$ are designated and $I(s) = I(t)$.

$V(s=t) = F$ iff $I(s)$ und $I(t)$ are designated and $I(s) \neq I(t)$ or ($I(s)$ is not designated or $I(t)$ is not designated or both are not).

There are no differences concerning the truth- and falsity conditions of (a) connectives sentences and (b) quantificational sentences between classical predicate logic and standard negative free logic. I assume familiarity with these conditions provided by classical predicate logic.

It is a further feature of standard negative free logic that it conceives of 'exist' like 'is identical with' as a logical predicate and therefore assigns to this predicate the following fixed interpretation:

A.5. Existential Sentences

[16] An interpretation I of an individual constant α is designated iff I assigns to α an object of the domain of discourse.

V(E!t) = T iff I(t) is designated.

V(E!t) = F iff I(t) is not designated.

It is a desired feature of such a logical system that most logical truths apart form (E4) and (E5) that are logical truths relative to classical predicate logic with identity are also logical truths relative to standard negative free logic.

In opposition to standard negative free logic *unrestricted neutral free logic* provides a more extensive modification of the semantics of classical predicate logic. These further modifications are the consequence of the acceptance of a third truth-value NEITHER-TRUE-NOR-FALSE. We have to add conditions that concern this third value to every kind of sentence. In case of (a) atomic sentences, (b) identity sentences and (c) connective sentences this leads to the following relatively minor changes:

B.1. Atomic Sentences

$V(Pt_1...t_n)$ = T iff $I(t_1)$, … ,$I(t_n)$ are designated and $<t_1,...,t_n> \in I(P)$

$V(Pt_1...t_n)$ = F iff $I(t_1)$, … ,$I(t_n)$ are designated and $<t_1,...,t_n> \notin I(P)$)

$V(Pt_1...t_n)$ = N iff $I(t_1)$, … ,$I(t_n)$ are designated

B.2. Identity Sentences

V(s=t) = T iff I(s) and I(t) are designated and I(s) = I(t).

V(s=t) = F iff I(s) und I(t) are designated and I(s) $\neq$ I(t)

V(s=t) = N iff I(s) is not designated or I(t) is not designated or both are not.

B.3. Connective Sentences

P	**Q**	**(P $\wedge$ Q)**	**(P $\vee$ Q)**	**(P $\rightarrow$ Q)**	**(P $\leftrightarrow$ Q)**	**$\neg$P**
T	**T**	T	T	T	T	F
T	**F**	F	T	F	F	
F	**T**	F	T	T	F	T
F	**F**	F	F	T	T	
T	**N**	N	N	N	N	
N	**T**	N	N	N	N	N
F	**N**	N	N	N	N	
N	**F**	N	N	N	N	
N	**N**	N	N	N	N	

The treatment of quantificational sentences requires more severe adaptions on the basis of the acceptance of a third truth-value. This leads to the following valuation-conditions:

B.4. Quantificational Sentences

$V(\exists xA) = T$ iff there is at least one $d \in D$, $V_{(t,d)}(A(t/x)) = T$

$V(\exists xA) = F$ iff for every $d \in D$, $V_{(t,d)}(A(t/x)) = F$

$V(\exists xA) = N$ iff there is at least one $d \in D$, $V_{(t,d)}(A(t/x)) = N$

$V(\forall xA) = T$ iff for every $d \in D$, $V_{(t,d)}(A(t/x)) = T$

$V(\forall xA) = F$ iff there is at least one $d \in D$, $V_{(t,d)}(A(t/x)) = F$ and there is no $d \in D$, $V_{(t,d)}(A(t/x)) = N$

$V(\forall xA) = N$ iff there is at least one $d \in D$, $V_{(t,d)}(A(t/x)) = N$

Again we conceive of the existence predicate as logical predicate, but we assign the following slightly different fixed interpretation to it:

B.5. Existential Sentences

V(E!t) = T iff I(t) is designated.

V(E!t) = N iff I(t) is not designated.

It has to be noticed that an unrestricted neutral free logic is a very weak logic and in the classical strong sense there are no classical logical truths on its basis. But we can define a weaker sense of a logical law to re-establish on this basis most classical logical laws.

Before I will discuss objections against these two outlined versions of free logic, let me illustrate why a solution based on either of these logics has several advantages over other kinds of solution that are based on different logical frameworks.

5. Two Motivations for a Solution based on Negative or Neutral Free Logic

In my opinion, there are several reasons that favour a solution based on strategy C in combination with a negative or neutral free logic over alternative solutions. But I only want to discuss two of them here.

5.1. Logical Purity

In my opinion, there are several reasons that favour a solution based on *strategy C* in combination with a negative or neutral free logic over alternative solutions. But I only want to mention two of them here.

There first concerns *logical purity*. It is a difficult *metaphysical* question whether it is possible that nothing exists. It is also an important *semantic* question whether there are and can be meaningful proper names that to not designate. Both of these questions are not a logical concern and should not be decided by logical restrictions or the formulation of logical laws. So a logic that is neutral in this respect and can cope with either answer to both questions is preferable to a logic that already presupposes an answer to these questions on the basis of logical restrictions. Universally free versions of negative and neutral free logic satisfy this requirement and are therefore logically austere in this respect. This is a major advantage of such a framework over a framework that makes use of classical logic. According to classical logic the following formulas are logical laws:

(E4) $\exists x(Fx \vee \neg Fx)$

(E5) $\exists x(x=a)$

(E6) $\exists y \exists x(x=y)$

(E7) $\exists x(x=x)$

The fact that these sentences are logically true already presupposes an answer to both mentioned questions which have nothing to do with the concerns of logic. But these sentences are not logical laws on the basis of a universally negative or neutral free logic. It is an evident virtue of a universally free logic that it does not assign the status of logical laws to sentences, which should not be conceived as *logical* laws. Logical purity favours a solution based on negative or neutral free logic over a logical framework that conceives of sentences like (E4) – (E7) as logical laws.

I will now give further reasons why a logical framework that can be used to specific the semantics of empty names should be favoured over a logical framework that is incompatible with the existence of empty names represented by individual constants without a denotation.

5.2. The Intelligibility of Empty Proper Names

The second motivation for a solution based on negative or neutral free logic concerns the intelligibility of empty proper names. Intuitively, we can distinguish three different sorts of name-like expressions. *Prototypical proper names*, these are expressions that denote an object purely on the basis of a conventional assignment of an expression to an object, *descriptive proper names*, these are expressions that grammatically are indistinguishable from proper names, but semantically function as abbreviations of definite descriptions and are introduced by specific acts of stipulation; and finally *empty proper names*, these are expressions that can be used in a singular term position, they neither denote an object on the basis of a conventional assignment nor do they function like definite descriptions, they do not denote objects at all.

We must distinguish two questions concerning these categories: (a) Are there any possible expressions of some actual or possible language that fall under these three categories? (b) Are there any expressions of any actual natural language that fall under these three categories? There are philosophers who answer both kinds of question negatively concerning the category of empty names. For these philosophers either every name has to be a prototypical name or every name has to be a descriptive name or every name has to be either a prototypical or descriptive name. Are there any good reasons for such kinds of restrictions? I do not think so. Firstly, because we can use different versions of free logic to account for the meaningfulness of empty proper names. Secondly, there are facts concerning the use of proper names in natural language that suggest that the category of an empty proper name should not be questioned with levity.

Negative and neutral free logic assign truth-conditions to formulas that contain individual constants that do not designate. If we make use of such a free logic to solve our initial problem we assume that individual constants are the formal counterparts of proper names, therefore we can provide a formal semantics for natural languages sentences that contain empty proper names and justify their meaningfulness on this basis. But we can also give an account of the understanding of a proper name that is either prototypical or empty on the basis of a framework that makes use either of negative or specific restricted versions of neutral free logic. This account holds that our actual understanding of a genuine or empty proper name is constituted by our implicit inclination to accepted instances of the following schema:

(NS) $\forall$x('n' refers to x iff x=n).

On the basis of both kinds of logical framework instances of (NS) that concern *designating* and *non-designating* individual constant come out as true. Therefore, we can account for the understanding of both kinds of names on this basis.

The mentioned versions of free logic provide a framework that can account for the truth-conditions of sentences that contain empty names and that nicely can be combined with a conception of the understanding of such kinds of names. This framework therefore provide a way to explain the meaningfulness of empty proper names. So a positive answer to question (a) concerning the category of empty proper names seems to be justified.

Can we also make the case for a positive answer to question (b) concerning the category of empty proper names? In principle, there seem to be different candidates concerning expressions of natural languages that might be conceived of as empty names. The two most plausible cases are, in my opinion, (i) proper names that are currently used on the basis of the unrecognized false belief that they designate something, but which in fact do not have a referent and (ii) and proper names that have been used for a certain time in the past on the basis of the unrecognized false belief that they designate something, but which in fact did not have a referent.

We may also consider names of objects that existed in the past and so-called fictional names as candidates for empty proper names. But in case of these two kinds of names a decision concerning there semantic status also depends on rather difficult metaphysical issues. In the first case we would have to take a stance concerning the debate about presentism and eternalism and commit one to the view of presentism. In the second case we would have to decide the issue whether there are fictional characters and whether there are names that can be used to refer to these characters. The discussion of these two difficult topics is beyond the scope of this paper, so we should concentrate our attention on the other mentioned kinds of candidates for empty proper names. It is obviously impossible to discuss examples of kind (i) that concern our own present use of proper names.[17] Examples of category (i) that concern the use of names of other current users seem to be in any case more controversial than a certain class of examples of category (ii).

This category concerns names that were used in the past by a large part of the human population with the unrecognized false belief that they do designate something, but which are used by nearly nobody or at least a very small number of people currently on the basis of such a false belief. The proper names ‘Zeus’ and ‘Vulcan’ seem to be examples of this kind.

‘Zeus’ was used and introduced as proper name for the highest of the Greek gods and the majority of the Greek people during ancient times used this name on the basis of the unrec-

[17] An atheist might claim that several people use the name ‘God’ with the false belief that it refers to something.

ognized false belief that it refers to something. Nowadays, nearly nobody believes in the existence of Zeus.

In case of ‘Vulcan’ things are a bit different, because the expression ‘Vulcan’ was introduced on the basis of the *hypothesis* that there might a planet that explains the perturbations in the orbit of Mercury. So when the expression was introduced the person who introduced it was not quite sure whether the object he aims to pick out does exist, but he nevertheless believed in the existence of this object.

Is it possible to explain the meaningfulness of names like ‘Zeus’ or ‘Vulcan’ without treating them as descriptive names? I think so. Let us focus for this purpose a bit more narrowly on the nature of acts of baptism, which are a specific kind of speech acts. An act of baptism is a prototypical way to introduce a proper name into discourse. By an act of baptism I mean an act of attaching a name to an object. It can most explicitly be performed by using a naming-verb with performative force. Such utterances may have the form ‘I (hereby) name x *N*’ or ‘Let us name x *N*’. We can substitute for ‘*N*’ the name we want to attach and for ‘x’ an expression that aims to picks out a specific object, to which we want to attach the name. On this basis we can distinguish *ostensive* from *descriptive* acts of baptism. If we substitute ‘x’ with some sort of definite description and use this description in an attributive way, we can perform on this basis a *descriptive* act of baptism. If we substitute ‘x’ with a singular term that requires a directing intention to fix the reference of this term, we can perform on this basis an ostensive act of baptism.

We can distinguish success-conditions and felicity-conditions in case of the performance of a speech act. Success-conditions describe the conditions that have to be satisfied that a certain act is successful performed. Felicity-conditions describe conditions that have to be satisfied by a perfect or prototypical example of such a speech act. The satisfaction of felicity conditions can therefore be more demanding than the satisfaction of success-conditions.

Which role can an act of baptism play concerning the class of names we are interested in? To be able to answer this question we have to decide whether the existence of the object that should be baptized and the belief in the existence of such an object are conditions that have to be satisfied by a successful performance of an act of baptism.

It is the essential purpose of an act of baptism to establish a stipulative link between an expression and an object, which might be described by the relational expression ‘is a name of’. This thesis can be justified in the following way: An act of baptism, as we conceived it here, is an act of naming and acts of naming aim to attach a specific name to a specific object. Therefore, it is the essence of a successful act of naming to establish the desired link between a name and an object. We can describe the stipulative element of an act of baptism in the following way: If P names x *N*, P declares x to be the name-bearer of 'N'. If someone declares x to be the name-bearer of 'N', x is the name-bearer of 'N'. That is, there are specific kinds of relations such that a declaration that an object stands in this relation to another object, is sufficient for the obtaining of this relation between these two objects.

It seems to be quite plausible to claim that such a stipulated link can only be established if both relata exist (or if someone conceives of existence as a discriminating property if the expressions that are used to establish the link refer to something). Therefore, the successful performance of an act of baptism seems to presuppose the existence of the object that should be named (or a successful reference to the object that should be named). Therefore, this condition is a precondition of the successful performance of an act of baptism.

What is the status of the belief-condition? Is it a necessary requirement for a successful act of baptism that the baptizer believes in the existence of the baptized object? If someone aims to stipulate a link between two objects, he has to believe in the existence of these objects for this purpose or he has to believe at least that the terms he uses to establish the link refer to something. On this basis we can restate our question: Is it necessary to have an intention to provide a link between two objects by a stipulation to achieve the desired link or is it only necessary to purport such an intention by the performance of a certain utterance? I think we should not assume that there are unintentional acts of naming an object. If a baptizer does not have the intention to name something by a certain utterance, he cannot succeed in his task.

So the belief in the existence of the baptized object seems to be also a precondition of a successful performance of an act of baptism; the desired link cannot be established by someone who does not believe in the existence of the baptized object.

Against this background we can provide the following possible explanation of the introduction of the names 'Vulcan' and 'Zeus'. It is possible that both names have been introduced by an (at first) unrecognized unsuccessful descriptive act of baptism, which had a successful act of initiation of a name using practice as its consequence. That is, certain unsuccessful acts of baptism that are not immediately recognized as such can have the same perlocutionary effects as successful acts of baptism, namely the initiation of a name-using practice. These acts have been unsuccessful, because contrary to the belief of the person that introduced the name the description he used to pick out an object did not satisfy an object.

If we accept such kind of introduction of an intelligible name, we can now even strengthen our case for a view that makes use of intelligible empty names to explain certain phenomena of our uses of names in natural language. If we accept the view that there are not immediately recognized unsuccessful acts of baptism and that there are expressions that can be used in a meaningful way as a consequence of the performance of such an act, then we can show that no alternative view can make the case for the meaningfulness of such names in a plausible way.

Let us have for this purpose a look at possible scenario of an unsuccessful attempt to baptize a concrete object, namely a planet. If I aim to baptise a planet by using the sentence 'I hereby name the planet that causes the perturbations in the orbit of Mercury *Vulcan*' and there is no (concrete) plant that satisfies this description my attempt of baptizing something was clearly unsuccessful. It would be ad hoc and implausible to say that even if there is no concrete object that satisfies the used description there is always a merely possible object or some sort of object that satisfies such a description.[18]

Such a move is question-begging, because the expression 'the planet that causes the perturbations in the orbit of Mercury' seems to have the same satisfaction conditions as 'the concrete planet that causes the perturbations in the orbit of Mercury' and the second description cannot be satisfied by a merely possible object. And even if someone does not accept this equivalence, he has to accept that someone that aims to name a certain planet has the intention to name a planet in space and time, and such an attempt fails if there isn't a concrete plant that satisfies the used description. Additionally, one may use the second description to perform an act of the desired kind and we cannot explain on this basis how such an act can be successful without the existence of a certain concrete planet.

What are the options for a defender of the view that every meaningful proper name has to name some sort of object if he grants that there are not immediately recognized unsuccessful acts of baptism? I think, there are no really plausible options to account for the meaningfulness of a name whose use is initiated by such an act.

[18] Someone who holds the view that apart from the property of existence merely possible objects do not exemplify properties like concrete or abstract objects, does not have the resources to account for the success of an act of baptism in any case.

Firstly, he might claim that an unsuccessful act of baptism concerning a concrete object is always implicitly accompanied by a successful act of baptism concerning a merely possible or abstract object. But such an account is implausible, because in such cases a speaker does not have any communicative intentions to name an abstract or merely possible object, because he thinks that the concrete object he aims to name exists. But the performance of a further indirect speech act requires such additional communicative intensions. Therefore, this reaction is implausible and ad-hoc.

Secondly, he may claim that the use of some other kind of expression than a name is established by such an unsuccessful act of baptism. But even if we would grant that there are descriptive stipulations and that descriptive names are semantically not genuine names, this options is implausible, because the *indirect* establishment of the meaning of such an expression again remains a mystery. The problem seems to be a universal one for any desired *indirect* establishment of a meaningful expression on the basis of the given setting.

Name-using practices that are established by unrecognized unsuccessful acts of baptism seem to offer the best examples of intelligible empty proper names in natural language. A framework based on some sort of free logic seems provide the best and most simple explanation of the meaningfulness of expressions that have the described features.

Let me summarize our findings: There are two motivations that favour an analysis of singular existential sentence based on a negative or neutral free logic based over other alternative solutions to our initial problem. Firstly, it seems to provide the desired and adequate logical neutrality concerning certain metaphysical and semantic issues; secondly, it seems to be the only considered solution that can account for the fact that there are meaningful empty proper names in natural languages.

6. Problems of a Solution based on Negative or Neutral Free Logic

The mentioned two motivations seem to provide good reasons to adopt a solution to our initial problem based on some sort of a negative or neutral free logic. But standard negative free logic and unrestricted neutral free logic are logical systems that make incompatible assumptions and both systems can be modified in different plausible ways. So there still remains the task of deciding which of different possible logical frameworks is the best choice for our purposes. I will try to decide this issue by discussing several problems and objections that have been put forward against standard negative free logic and unrestricted negative free logic. The discussion of these objections will show that the specific version of a restricted negative free logic is the most adequate framework to defend a solution of our initial problem based on the rejection of the Truth-Condition-Thesis.

6.1. The objection from equivalent predicates with different polarity

At first I will discuss three objections against standard negative free logic. The first objection can be called the *objection from equivalent predicates with different polarity*. It is a common feature of natural language that we can express the same propositions by means of different sorts of expressions. In some cases we can express the very same proposition either by using a simple predicate F or by using the negation of a simple predicate G. 'Peter is an adult' intuitively expresses the same proposition as 'Peter is not a minor' and 'Peter is different form Michael' expresses the same proposition as 'Peter is not identical with Michael'. These facts seem to be undeniable if 'Peter' and 'Michael' are used to refer to the very same object relative to the considered pairs of sentences. But it also seems to be plausible that the two mentioned pairs of sentences have in some sense the same content if 'Peter' and 'Michael' do not designate any object relative to their uses in this sentences. But this intuition is problematic for a defender of standard negative free logic.

According to the standard procedure of assigning logical forms to our example sentence, 'Peter is an adult' gets the logical form 'Fa', 'Peter is not a minor' gets '¬Ga', 'Peter is different form Michael' gets 'Rab' and 'Peter is not identical with Michael' gets '¬Sab'. If we now assume that the constants 'a' and 'b' do not designate objects, then we have to assign to 'Fa', 'Ga', 'Rab' and 'Sab' the truth-value FALSE according to the treatment of atomic sentence with non-designating constants according to standard negative free logic. As a consequence of this, we have to assign to '¬Ga' and '¬Sab' the truth-value TRUE. Therefore, the mentioned pairs of sentence are pairs of sentence with different truth-values. This result leads to a problem if we combine it with further plausible principles.

Intuitively the sentence 'Peter is an adult' expresses the same proposition as 'Peter is not a minor' if they are used relative to the same context of utterance, in this sense they have the same context-relative truth-conditions. These two sentences also get the same truth-value if they are assesses relative to the same parameters of the context of evaluation. Therefore, they also have the same assessment-relative truth-conditions. But if two sentences have the same context- and the same assessment-relative truth-conditions, then they also have the same truth-values relative to the same context of use and context of evaluation. But this result is incompatible with the proposed assignment of truth-values according to standard negative free logic. According to this assignment the relevant sentences have different truth-values relative to every context of use and every context of assessment, if ‘Peter’ and ‘Michael’ do not designate.

How can a defender of standard negative free logic react to this problem? There seem to be two possible reactions. Firstly, he can try to explain away the intuitions concerning sentences that contain equivalent predicates with different polarity. But it seems to be quite difficult to substantiate such move.

Secondly, he could try to alter the semantics of negation to capture the mentioned intuitive data. Two different strategies for this purpose seem to be available. The first strategy holds that there are two different non-equivalent ways to negate a sentence in natural language and one of these kinds of negation explains our intuitive acceptance of the mentioned equivalences.[19] In natural language we can negate a predicate like ‘is an adult’ by inserting the negation-device ‘not’ after the copula verb or by adding suffixes like ‘non-’ or ‘un-‘ or the like to a predicate. There is in fact an intuitive difference between the semantics of the expression ‘is not happy’ and ‘is unhappy’. A person that is not happy might not be unhappy, but in some neutral state. But on the other hand there seems to be no intuitive difference between ‘is not an adult’ and ‘is a non-adult’ and only the suffix ‘non-‘, but not a suffix like ‘un-‘ can be applied to nouns and adjectives in a universal way to form well-formed expressions. So in some cases there might be a suffix-negation that has different semantic effects than the insertive negation by means of ‘not’. But on this basis we cannot provide a general rational that allows us to generate only true instances of

(P1) $\forall$x(x is an adult $\leftrightarrow$ $\neg$(x is a minor)), and

(P2) $\forall$x$\forall$y(x is distinct from y $\leftrightarrow$ $\neg$(x is identical with y)),

or similar claims that make use of an alternative kind of negation. And even if such a second kind of negation could be established in a uniform way, there still remains our strong intuition that ‘Peter is an adult’ and ‘Peter is not a minor’ should express the same content even

[19] Mark Textor and Mark Sainsbury suggested this strategy to me.

if 'Peter' does not designate. And there is no good reason to assume that 'not' is ambiguous in this case.[20]

A second strategy holds the view that the negation-operator is not really a truth-functional operator. That is, the assignment of a truth-value to a sentence of the form '¬P' does not exclusively depend on the truth-value of 'P', but on further factors as well; in our case on the fact whether 'P' contains any non-designating constants. So the idea to solve our problem is that we only assign the truth-value TRUE to a sentence of the form '¬P' if 'P' is has the truth-value FALSE and it contains no non-designating constants.[21] Such an adaption would in fact solve our problem, but it also seems to be ad hoc and have no plausible systematic motivation.

Therefore, I cannot see any plausible way for a defender of negative free logic to solve the mentioned problem.

6.2. The objection from arbitrariness

The second objection against negative free logic is *the objection from arbitrariness*. According to standard negative free logic the truth-value of an atomic sentence that contains at least one non-designating individual constant is false per default. But this means that the truth-value of certain sentences arbitrarily depends on our choice of atomic predicates. There is no clear non-arbitrary criterion which predicates should be conceived as atomic and which not.

It has to be noticed that we cannot identify atomic predicates with primitive predicates. We may conceive 'is a minor' as a primitive predicate and define the predicate 'is an adult' on its basis. But we may also proceed the other way round. There is no plausible criterion for this choice. It is up to us and a matter of stipulation. But independently from our choice which of the mentioned predicates is primitive, we would represent 'is an adult' and 'is a minor' by different predicate symbols and therefore a sentence that contains one of these predicates and an individual constant as further constituent has to be conceived as an atomic sentence. So the determination of atomic sentences is completely independent from our choice of primitive predicates.

[20] See also: Sainsbury (2005, 70-71; 196-198).
[21] Peter Sutton suggested this strategy to me.

What counts as an atomic predicate seems to be pure and arbitrary morphological and syntactic matter. From this point of view ‘is mortal’ and ‘is immortal’ would both be conceived as atomic predicates. Although from a semantic point of view this seems to implausible, because it is clear that the prefix ‘im-‘ is an explicit device of negation. On the other hand neither ‘is an adult’ nor ‘is a minor’ clearly involve a semantic marker of negation, nevertheless ‘is an adult’ is semantically equivalent with ‘is not a minor’ and ‘is not an adult’ with ‘is a minor’. This shows that there is no clear systematic criterion of what we should conceive as an atomic predicate. Our choice seems to be a rather arbitrary matter. But it is implausible to hold that the truth-values of sentences like ‘Peter is mortal’, ‘Peter is immortal’, ‘Peter is an adult’ and ‘Peter is a minor’ depends on such arbitrary facts of the morphology and syntax of a natural language, if ‘Peter’ does not designate anything.

Neither this problem nor the mentioned problem concerning equivalent predicates with different polarity is a problem for a defender on a neutral free logic as long as he makes use of choice negation. On this basis every atomic sentence that contains at least one individual constant without a denotation and its negation receive the truth-value NEITHER-TRUE-NOR-FALSE and so we have no troublesome and counterintuitive difference in truth-value between a sentence like ‘Peter is not a minor’ and ‘Peter is an adult’ if we formalize this sentences in the standard way and if ‘Peter’ does not designate anything.

6.3. The objection from unsystematic truth-conditions

The third, last and in my opinion most important objection against standard negative free logic concerns the proposed modification of the classical falsity-conditions of atomic sentences. Standard negative free logic changes the falsity-conditions of atomic sentences according to classical logic in such a way that an atomic sentence like ‘Fa’ not only then gets the truth-value FALSE, if the referent of ‘a’ is not an element of the extension of ‘F’, but also if ‘a’ does not designate anything. Standard negative logic therefore weakens the classical falsity-conditions of atomic sentences by adding a further condition by means of a disjunction. But such a move seems to lack any systematic motivation and seems to be only an ad hoc manoeuvre to close truth-value gaps. A defender of standard negative free logic has the burden of proof to justify his move of closing truth-value gaps. I don’t know any good systematic reasons for this move. The driving force seems to be the instrumental reason to be able to combine the postulation of a partial interpretation function with a bivalent logic.

A defender of a neutral free logic on the other hand does have a systematic motivation why we should not alter the classical truth- and falsity-conditions of atomic sentences and why we should instead of modifying these conditions accept truth-value gaps and a further condition that specifies under which conditions an atomic sentence is NEITHER-TRUE-NOR-FALSE.

It is a widely accepted phenomenon of natural language that certain expressions trigger relative to certain contexts of use so-called semantic presuppositions. These presuppositions are preconditions that have to be satisfied that a sentence that triggers such a presupposition can receive a classical truth-value. Neutral free logic aims to account for the presuppositions that are triggered by proper names represented as individual constants. The majority of atomic sentences have the semantic presupposition that the singular terms they contain designate something. If this presupposition is not satisfied, such a sentence cannot receive one of the classical truth-values and therefore receives the value NEITHER-TRUE-NOR-FALSE. This conception is implicitly also accepted by a defender of classic logic, because according to him the following conditional holds: If an atomic sentence is either true or false, then the individual constants that such a sentence contains designate something. It should be noticed that only in case of atomic sentences that do not contain a logic predicate the condition holds without exception that if this sentence contains at least one non-designating constant, then the sentence is neither true nor false. Such a condition also does not necessarily hold in case of connective sentences, because a connective may have a specific semantics that does not project the presuppositions of the embedded atomic sentences to the resulting complex sentence. The upshot of this is the following: It is a systematic advantage of a neutral free logic if it aims to capture the phenomenon of semantic presuppositions in natural language, but a neutral free logic has to be adapted insofar that it makes the correct predictions concerning embedded atomic sentences and their presuppositions. This observation immediately leads us to the first of three objections a want to discuss in connection with neutral free logic.

6.4. The objection from overgeneralization

This first objection is directed against the commitment of unrestricted neutral free logic to a principle that is often called *Frege's principle*. One can find different versions of Frege's principle in the literature as the rationale behind the construction of a neutral free logic. We can distinguish at least the following three versions:

(FP1) Every sentence that contains at least one individual constant without a designation is neither true nor false.

(FP2) Every embedding of a referring expression which, in the embedding, has no referent yields a sentence that is neither true nor false (or has no truth-value). [Sainsbury (2005, 67)]

(FP3) The truth-value of every sentence is a function of the extension of its constituents. [Lehmann (1994, 307)]

Unrestricted neutral free logic clearly can be described as a logic that either satisfies (FP1) or is constructed on the basis of (FP1) as its guiding-principle if it comes to the assignment of truth-value gaps (or the value NEITHER-TRUE-NOR-FALSE) to sentences of any kind.

The second mentioned principle can be understand as a variation of (FP1) if one reads 'embedding' in a very loose sense such that every occurrence of a referring expression in a sentence is an embedded occurrence. Alternatively one could understand 'embedding' in a more narrow sense such that every occurrence of a referring expression in a logically complex sentence is an embedding. On the basis of this reading (FP2) is not identical with (FP1), but only implied by (FP1).

The relation between (FP1) and (FP3) depends on what we exactly conceive as the extension of certain expressions. (FP3) has the consequence: if there is an expression with no extension as component of a sentence S, then S receives no truth-value: *no input, no output*. According to a strictly Fregean understanding the extension or reference of monadic predicate would be a function from objects into truth-values and the extension of quantifier would be a second-order function from first-order functions into truth-values.

Lehmann conceives of quantifiers in a Fregean way. This has the consequence that every quantificational sentence receives a classical truth-value, because every open sentence that is the constituent of such a quantificational sentence denotes a certain function. On the basis of this reading (FP3) and (FP1) are different principles and (FP3) is not satisfied by our unrestricted neutral free logic. If we would use (FP3) as a construction principle for a neutral free logic, this would lead to different truth-conditions for quantificational sentences.

Sainsbury makes use of the mentioned narrow reading of (FP2) and aims to demonstrate its incorrectness by providing a counter-example. He points out the following:

> Yet is seems hard to exclude the possibility of an operator, say 'Neg', which can attach to any intelligible sentence S to form a truth just on condition that S is not true […]. Even if S is without truth value, 'Neg S' is true [.][22]

It is absolutely correct what Sainsbury points out. There are also alternative ways to understand the other standard connectives. One could, for example, conceive of a disjunction as true if at least one of the disjuncts is true. There are lots of different ways to construct a neutral free logic and a large number of these possibilities are backed up by *prima facie* plausible principles. But the question is what Sainsbury's observation shows. It does not show that we cannot use (FP1) or (FP2) to construct a logical system on the basis of these principles. It depends on the purpose of such a logic, whether the use of one of the mentioned Fregean principles is justified. If the purpose of our logic is to provide a formal semantics for a natural language or a specific subpart of natural language, then Sainsbury has to show more than to point out the possibility of the introduction of a certain operator whose semantics is incompatible with (FP1)-(FP2). He has to show that in natural language we have got a device of negation that has the described feature such that its application transforms a sentence that is neither true nor false into a true one.

The expression 'It is neither true nor false that p' seems to have the desired feature, but it cannot be regarded as device of *negation* in English. We could argue that 'It is not true that p' and 'It is not the case that p' are not equivalent with 'It is false that p' and that these expressions are the counterparts of different monadic-connectives of a formal language. Expressions of the form 'It is F that' are often conceived of as natural-language-counterparts of certain monadic connectives. But this is a misconception. Expressions of the form 'It is F that p' are in the most cases semantically equivalent with expressions of the form 'That p is F', because this two expressions have the same semantic constituents, namely the expression 'that p' that designates propositional contents and the predicate 'is F'. The pronoun 'it' that an expression of the form 'It is F that p' contain does not have a semantic function, it is a purely syntactic placeholder for the logical subject 'that p'. On this basis it becomes apparent that the devices for negation in natural language are quite different from the devices in

[22] Sainsbury (2005, 67).

predicate logic. We have the predicate modifier ‘not’ and suffixes like ‘non-‘, ‘un-‘, ‘im-‘ and ‘in-‘ to express negation in the natural language English. But it is not at all clear whether these expressions have a semantic impact on expressions that is equivalent with the semantic function of ‘Neg’ according to Sainsbury. So I think, as long as Sainsbury cannot provide clear evidence that there is a device of negation that corresponds to ‘Neg’ his objection does not show what it aims to show. Namely, that an unrestricted neutral free logic does not provide an adequate description of a certain part of our discourse that makes of non-designating names.

I have argued that the systematic motivation for favouring the valuation-conditions for atomic sentences that are provided by unrestricted neutral free logic over those of standard negative free logic is the desire to cover the phenomenon of semantic presuppositions triggered by proper names. It is a widely accepted phenomenon that presuppositions that are triggered by a component of sentence S are also triggered by the same component if S is negated. That is, presuppositions seem to survive the operation of negation. If this is a general truth concerning the semantics of natural language, we have good reasons to deny that the negation-operator proposed by Sainsbury should be used by a formal representation of natural language semantics.

6.5. The objection from singular existential sentences

Let us now focus on a more promising objection against (FP1) and (FP3) provided by Sainsbury. Sainsbury claims that intuitively an existential claim like ‘Vulcan exists’ is false and its negation ‘Vulcan does not exist’ is true, if ‘Vulcan’ does not designate an object. Someone who thinks that either the principle (FP1) or the principle (FP3) should be satisfied by a predicate logic that represents the formal semantics of natural language or a certain part of natural language, cannot account for this data if he treats existential sentences as atomic sentences.

A defender of (FP1) does not even have the resources to account for the intuitive truth-values of the mentioned sentence-pair if he rejects the claim that ‘Vulcan exists’ be regarded as an atomic sentence. He would also undermine by such a move one of the given motivations for an analysis of existential sentences based on a negative or neutral free logic. But not only that, a defender of (FP1) would complicate the matters unnecessarily. Such a solution would not only require the rejection of the Logical-Form-Thesis and the Truth-

Condition-Thesis, but also the Truth-Value-Thesis, because on its basis no sentence that contains a non-designating term that is represented as an individual constant can have a classical truth-value. So the acceptance of (FP1) has an implausibly high price and we should not use it as a principle that guides our construction of negative free logic for the required purposes.

The prospects of a neutral free logic that makes use of (FP3) as its semantic principle of construction to solve the proposed problem seem to be on the first sight a bit better. As we have already noticed, a defender of (FP3) is committed to replace the valuation-conditions of quantificational sentences by the following conditions:

C.5. Quantificational Sentences

$V(\exists xA) = T$ iff there is at least one $d \in D$, $V_{(t,d)}(A(t/x)) = T$

$V(\exists xA) = F$ iff there is no $d \in D$, $V_{(t,d)}(A(t/x)) = T$

$V(\forall xA) = T$ iff for every $d \in D$, $V_{(t,d)}(A(t/x)) = T$

$V(\forall xA) = F$ iff there is a $d \in D$, $V_{(t,d)}(A(t/x)) \neq T$

He is committed to this replacement, because he interprets quantifiers as second-order functions from first-order functions into truth-values. On this basis every quantificational sentence has to receive a classical truth-value, because there is always an input for a function designated by a quantifier.

Such a modification seems to licence now also a rejection of the analysis of the existence predicate on the basis of unrestricted neutral free logic and therefore the proposal of a more adequate analysis of singular existential claims. A defender (FP3) may now claim, as Lehmann does, that an existential claim like 'Vulcan exists' has the logical form '∃x(x=t)' and that a negative existential claim like 'Vulcan does not exist' has the logical form '¬∃x(x=t)'. Against this background he can account for the intuitive truth-values of singular existential claims.

This seems to be a viable option on the first sight, but let me show why I think it is not possible to provide an adequate solution to our initial problem on the basis of an acceptance of (FP3). Someone who holds this view must not only additionally to the Truth-Condition-Thesis reject the Logical-Form-Thesis, but he also has to reject the thesis that a sentence of the logical form '∃x(x=t)' is logically equivalent with a sentence of the form 'E!t'. According to the given semantics the following holds: If ‘t’ does not designate anything, then ‘∃x(x=t)’ is false and ‘¬∃x(x=t)’ is true, while ‘E!t’ and ‘¬E!t’ are both neither true nor false. This observation has an important consequence. We cannot provide an adequate definition of a first-order non-discriminating existence predicate by means of the following claim ‘∀x(E!x =df ∃y(y=x))’. But we also cannot stipulate the desired meaning and extension of such a predicate by conceiving it as logical predicate with a fixed interpretation, because (FP3) does not allow such a move. Therefore, there seems to be no adequate way to conceive of the existence predicate as an expression of a first-order non-discriminating predicate. So we are again confronted with a version of a neutral free logic that undermines one of our given motivations for a solution based on the framework of free logic. If such a version of free logic wants to use ‘∃x(x=t)’ as the logical representation of singular existential sentences that contain proper names, it is committed to conceive of existence as a second-order property, because of its inability to interpret such a sentence as an ascription of a first-order property. But there seem to be good reasons to reject a second-order view on existence.[23] Therefore, I think, it is a good choice to reject (FP3) as well and don’t use it as a construction principle of a neutral free logic that should be used for a solution to our initial problem.

But there is also a further problem that a solution based on (FP3) has to face. If a sentence of the form ‘¬∃x(x=t)’ contains the non-designating term ‘t’, then according to the semantics of quantificational sentences proposed by (FP3) such a sentence is true. But the remarkable fact is that it is true, although the open sentence ‘¬(x=t)’ has no true instances. Every instances of this sentence is neither true nor false. This is a counterintuitive result. A similar consequence holds in case of ‘∃x(x=t)’ under the given assumptions. Such a sentence is false, although it has no false instances. Every instances of the open sentence ‘x=t’ is neither true nor false. Such a result is licenced by (FP3) and the view that quantifiers or a specific second-order functions. But it is not only counterintuitive, it also forces a rejection of Tarski’s classical notion of satisfaction. According to Tarski an object o satisfies an open sentence ‘x=t’ iff o=t and o does not satisfy ‘x=t’ iff ¬(o=t). But both conditions do not hold, if we conceive of ‘t’ as a constant that does not denote. Therefore, we cannot use Tarski’s notion of satisfaction to outline the truth-conditions of quantificational sentences. Insofar as Tarski’s notion of satisfaction is itself a technical notion this is not a major problem of this view. But it is a challenge for such a view why we should accept that quantificational sentence can be true, if

[23] C.f.: Rami (2012).

they have no true instances or false, if they have no false instances. The postulation of (FP3) by itself does not provide a plausible answer to this question. A further related problem is that Tarski's notion of satisfaction is intimately related with a notion of truth that is guided by the instances of the T-schema ''p' is true in L iff p'. If we reject that o satisfies 'x=t' iff o=t, then we also have to reject that 'o=t' is true iff o=t. And that seems to be an unwelcome consequence of Lehman's proposal.

We have rejected (FP1) and (FP3), because both principles are incompatible with the outlined task of providing a solution to our initial problem only on the basis of the rejection of the Truth-Condition-Thesis. We have already proposed a different way to construct a neutral free logic, namely on the basis of phenomena of semantic presupposition concerning proper names. We have seen that such an approach can provide a plausible justification for the truth-conditions of atomic-sentences based on a neutral free logic.

Can we also provide a correct analysis of singular existential sentences that only contain proper names on this basis? I think so, although it may appear on the first sight that this is not possible. If we conceive of existential sentences like 'Vulcan exists' and 'Vulcan does not exist' as atomic sentences, then these sentences provide an exception, because they do not trigger existential presuppositions like other atomic sentences. It would be pointless, if a sentence of the form 'Vulcan exists' would trigger the presupposition that 'Vulcan exists', because the presupposed content would be identical with the content of the sentences that has such a presupposition, but on this basis it could also not be a precondition for the truth of such a sentence and it is clearly not a precondition for the falsity of such a sentence. Existential sentences seem to provide a counterexample to the claim that every atomic sentence that contains a proper name represented as an individual constants triggers certain existential presuppositions.

If we want to avoid the falsification of this claim we seem to be forced to reject the thesis that singular existential sentence are in fact atomic sentences. This is a possible reaction, but it is not the only possible rejection. If it would be the only reaction, it would be confronted with similar problems than the two mention systems of neutral logic based on (FP1) and (FP3) have to face.

A further possibility is provided by exploiting the distinction between logical and non-logical predicates. It is a feature of a non-logical predicate that we can assign different extensions to such a predicate relative to different interpretations. A logical predicate on the other hand has a fixed interpretation and therefore also a fixed extension relative to a given domain of discourse. There are good reasons to conceive the existence predicate beside the identity predicate as a logical predicate on the basis of any framework of free logic. It is one of the distinctive claims of a free logic that the existence predicate plays an important role in validating certain arguments. We can for example in case of a free logic only derive form 'Fa' the sentence '∃xFx' if we also assume that a exists.

Existential sentence do have on this basis a distinctive logical role and if we conceive existential sentences as atomic sentences, then we should treat existence as a logical predicate. But if we conceive the existence predicate as a logical predicate, such a predicate has to receive a separate semantic treatment than other atomic predicates because of its fixed interpretation. This separation allows us to assign specific truth-conditions to such sentences that account for the specific logical role of the contained predicate and that distinguishes these *logical* atomic sentences from other atomic sentences.

If we want to do justice to the specific logical role of existential sentences and the mentioned features concerning presuppositions in natural language, we are forced to alter the truth-conditions of existential sentences. And in this case the specific logical role of existence sentences explains why they do not trigger presuppositions that normal atomic sentence trigger and why it is also necessary to treat such a sentence in a different way than other atomic sentences.

We are guided by the following principle: Only in case of atomic sentences that contain non-logical predicates it is guaranteed that they trigger existential presupposition in the described way. On this basis existential sentences provide no counterexample to our proposed truth-conditions for atomic sentences. We have to add the following further conditions to our logic, if we want to capture the specific semantic features of existential sentences on the basis of the outlined conception:

D.5. Existential Sentences

V(E!t) = T iff I(t) is designated.

V(E!t) = F iff I(t) is not designated.

So our first minor modification of unrestricted neutral free logic concerns an adaption of the truth-conditions of existential sentences that is licenced by their intuitive logical role that distinguishes such sentences from other sentences of the same grammatical form. But this minor revision is not *sufficient* to provide a plausible framework for a semantic analysis of singular existential sentences.

Our logical language contains two different *logical* predicates, the existence and the identity predicate. There are important intuitive dependences between the semantics of these predicates. A sentence of the form 'Vulcan exists' should receive the same truth-value as a sentence of the form 'Something is identical with Vulcan' relative to every interpretation and relative to every possible world. We are committed to the view that the first sentence has the logical form 'E!t' and the second most plausibly has the logical form '∃x(x=t)'. But we cannot account for this equivalence in truth-values on the basis of our minor modification of unrestricted neutral free logic, because according to this semantics a sentence of the form '∃x(x=t)' is neither true nor false, if 't' does not designate anything. Further adaptions of the semantics of our neutral free logic are required to cope with this intuitively plausible data.

There seem to be at least *two* possible ways to adapt our logic for this purpose, if the given truth-conditions of singular existential sentences remain untouched. The first option makes adaptions concerning the semantics of the existential quantifier; the second changes the semantics of the identity predicate.

If we chose option one, then the adaption provided by Lehmann seems to be the best way to reach the desired equivalences. On the basis of our rejection of (FP3) this move does not face *one* crucial problem that Lehmann had to face because of his commitment to (FP3). But there still remains the further mentioned problem concerning the rejection of a Tarskian notion of satisfaction to account for the semantics of open sentences.

But there is an another new problem that such a strategy has to face on the basis of our commitment to the view that a neutral free logic should capture existential presuppositions triggered by proper names. Someone may have the intuition that 'Some plant is larger than Vulcan' is plainly false if Vulcan does not exist. But on this basis he would have to accept as well that 'No planet is larger than Vulcan' is true relative to the same conditions, because this sentence is the negation of the former sentence. But such a consequence is unacceptable because we are intuitively inclined to hold that if 'No planet is larger than Vulcan' is true, then also 'Vulcan is the largest planet' is true. But such a transfer in truth-values is unacceptable if 'Vulcan' does not designate.

How should we react to this problem? The best way to capture the intuitive equivalence between sentences of the form 'E!t' and '∃x(x=t)' is to modify the semantics of the identity predicate in a way that we can account for the equivalence.
It is an interesting fact that in case of identity sentences we do not have the same clear and shared intuitions concerning the truth-values of these sentences as in case of existential sentences. Let us have a look at the following examples for this purpose:

(E25) Vulcan = Vulcan.

(E26) Vulcan = Zeus.

(E27) Vulcan = Neptune.

If we assume that 'Vulcan' and 'Zeus' do not designate anything and that 'Neptune' designates the planet Neptune, what are the intuitive truth-values of sentences like (E25)? There is no clear answer to this question. There are people who think that any claim that states self-identity should be true. Others think that (25) is false, because Vulcan does not exist, and there are people who think that (E25) is neither true nor false, because 'Vulcan' does not designate anything. But there are also people that have no clear intuitions at all concerning the truth-value of (E25).
The situation is rather similar in case of (E26) and (E27). The most significant difference between these examples and (E25) is that there is agreement that these sentences cannot be true on the given interpretations of the terms. But there are again people who think that these claims are false; others that think that they are neither true nor false; and there also people that have no idea which truth-value they should assign to (E26) and (E27).
The reason for this messy situation seems to be a certain sort of confusion about the semantic status of identity sentences and the nature of the identity relation. How can we resolve this confusion? In my opinion we have all the clues for this purpose in our hands. Firstly, we have clear intuitions about the truth-values of existential sentences that contain proper names. Secondly, we have found a semantic representation of these claims that fit with this data. Thirdly, we have clear intuitions about the equivalence in truth-values between existential sentences of the form 'E!t' and existential generalisations '∃x(x=t)' that contain the identity predicate. Fourthly, the identity predicate is a logical predicate and therefore we are free to assign specific valuation-conditions to identity sentences without altering on this basis the valuation-conditions of atomic sentences that contain non-logical predicates. Fifthly,

there is an intimate connection between the logical role of the existence predicate and the logical role of the identity predicate; therefore a certain assimilation of their semantics is welcome.

On the basis of this five plausible assumptions and on the basis of the diagnosed lack of clear intuitions concerning the truth-values of identity sentences it should be allowed to make certain reasonable *stipulations* concerning the valuation-conditions of identity sentences to account for the truth of the mentioned intuitively accepted claims.

This immediately leads to the view that identity sentences like existential sentences can only have classical truth-values and that identity sentences like existential sentence do not trigger existential presuppositions. The most plausible way to put forward such a view makes use of the following valuation-conditions for identity sentence:

D.2. Identity Sentences[24]

V(s=t) = W iff there is an x such that x=I(s) and x=I(t).

V(s=t) = F iff it is not the case that there is an x such that x=I(s) and x=I(t).

Against this background we can account for the intuitive equivalence in truth-value between sentences of the logical form 'E!t' and '∃x(x=t)'. We can do this without undermining our systematic motivation of capturing the phenomenon of *semantic existential presuppositions* triggered by proper names for the construction of a neutral free logic.

This alteration of the valuation-conditions of identity sentences is rather moderate and it also seems to have a good motivation. So I propose to make use of the mentioned two modifications of unrestricted neutral free logic as a semantic framework for the analysis of existential sentences in natural languages. Let us call this kind of logic *non-standard (presuppositional) neutral free logic*.

6.6. The objection from non-projective embedding

There remains at least one further problem concerning the justification of such a kind of neutral free logic on the basis of the given systematic motivation. Unrestricted neutral free logic makes use of the *weak Kleene* connectives and such valuations-conditions for connec-

[24] Alternatively one could claim that identity sentences of the form 'a=b' are *true*, if 'a' and 'b' designate the same thing, *false* if only one of this expressions designates something and *neither true nor false*, if they both designate nothing. Such a modification also leads to the desired results, but it seems to be more difficult to justify such extravagant valuation-conditions.

tive sentences predict that the existential presupposition of a sentence S projects in case of any embedding of S into a complex sentence build on the basis of the given standard two-place-connectives. But this seems to be an unwelcome result. We have accepted the claim that existential sentences like 'Vulcan exists' do not trigger existential presuppositions in opposition to normal atomic sentences like 'Vulcan is a planet'. But if we embed this two sentences into the following sentence,

(E28) If Vulcan exists, then Vulcan is a planet,

the second sentence intuitively does not project its existential presupposition to the whole sentence. In this sense the connective 'If…, then…' seems to block a projection of a presupposition of a component of (E28) to (E28) itself.

The intuitive semantics of disjunctions provide a further motivation to change the given valuation-conditions of connectives. For the truth of a disjunction it is sufficient that only one of the conjuncts is true. So if we have the sentence 'Vulcan is a planet or Neptune is a planet' this sentence is true, because 'Neptune is a planet' is true and although 'Vulcan is a planet' is neither true nor false. And even if both where true it is questionable whether they project the existential presuppositions to the disjunction itself.

To cope white such and similar data it seems to be necessary to modify the valuation-conditions of connective sentences that are provided by unrestricted neutral free logic. Such an account is for example offered in Peters (1979):

D.3. Connective Sentences

P	**Q**	**(P ∧ Q)**	**(P ∨ Q)**	**(P → Q)**	**(P ↔ Q)**	**¬P**
T	**T**	T	T	T	T	F
T	**F**	F	T	F	F	
F	**T**	F	T	T	F	T
F	**F**	F	F	T	T	
T	**N**	N	N	T	N	
N	**T**	N	N	N	N	N
F	**N**	F	T	N	N	
N	**F**	N	N	N	N	
N	**N**	N	N	N	N	

So if we assume that we can adapt the valuation-conditions of connective sentences in such a way that they capture the data in case of the mentioned projection-problems, we seem to have a logical framework that might function as basis for future extensions to a more complex logical language that captures modal and other more elaborated facets of our discourse concerning negative and positive existential claim that contain proper names in an adequate and plausible way.

6.7. The objection from logical laws

Let me discuss and try to reject one last and more fundamental objection that has been presented against three value logics in general to substantiate this impression about the usefulness of our neutral free logic a bit further.

This objection can be called *the objection from logical laws*. It is a significant property of unrestricted neutral logic that there are no sentences that are in the following classical sense logical truths according to this logic:

(CL) A sentence x is a (strong) **logical truth** iff for very interpretation I it is such that the semantic value of x relative to I is identical with the truth-value TRUE.

But there is a certain *ersatz*-notion of logical truth to compensate this shortcoming:

(WL) A sentence x is a **weak logical truth** iff there is no interpretation I such that the semantic value of x relative to I is identical with the truth-value FALSE.

So if we want to capture the vast number of *acceptable* logical laws according to classical logic we have to make use of this weaker notion of logical truth for such a purpose. But this adaption has the following counterintuitive consequence: At least some sentences that are weakly logically true are not true, because they have instances that are neither true nor false. Should we bother about this counterintuitive consequence? I do not think so. Firstly, our two defended modifications of unrestricted neutral free logic at least extend the class of logical truths to a certain degree. Secondly and more importantly, the notion of a logical truth is a technical notion whose main purpose is to explain the notion of validity and valid inference. As long as our used notion of a weak logical truth fixes the extension of validity and valid inference correctly, it is of no importance whether every so-called logical truth is in fact true or not. On the basis of (WL) we can define a logical consequence relation in the following way:

(LC) A sentence x **logical implies** a sentence y iff there is no interpretation I such that the semantic value of x relative to I is identical with the truth-value TRUE and the semantic value of y is identical with the truth-value FALSE.

Our *non-standard presuppositional neutral free logic* alters the extension of classically valid arguments only in so far as they concern the implausible presuppositions of classical predicate logic that a universally free logic aims to avoid. In this sense the mentioned last objection does not really undermine our project of providing a plausible semantic framework for the analysis of existential sentences that contains proper names as their grammatical subject. In my opinion, the presented and sketched logical framework has all the desired features that a plausible solution to our initial problem that is solely based on the rejection of the Truth-Condition-Thesis should have.[25]

7. Bibliography

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