

B - DESCRIPTION DU PROJET DE RECHERCHE

NOM et Prénom du candidat (à rappeler)	Friederike MOLTSMANN
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B1 – DESCRIPTION COURTE DU PROJET

(reprendre le texte de 15 lignes max. de la fiche d'identité du projet au § I.7 et sa traduction en langue anglaise)

Le projet a pour but d'établir une nouvelle direction de recherche à l'interface de la sémantique linguistique et des secteurs de la philosophie qui sont concernés par la référence et l'ontologie, à savoir la métaphysique (ancienne et contemporaine), la philosophie du langage (contemporaine et médiévale) et la philosophie des mathématiques. Bien que la sémantique linguistique ait considérablement progressé dans les trente dernières années dans l'étendue et le raffinement de ses recherches empiriques, elle s'est développée tout à fait séparément de la philosophie du langage, de la métaphysique, de l'épistémologie et de la philosophie des mathématiques. C'est une situation très insatisfaisante, en particulier pour les questions qui ont trait à l'ontologie, lesquelles ne peuvent être résolues sans la coopération de la linguistique et de la philosophie, et plus particulièrement des questions regardant la référence aux objets abstraits, qui ne peut pas être traitée sérieusement sans prendre en compte les diverses approches de la philosophie des mathématiques. Bien qu'il y ait quelques rares endroits aux Etats-Unis (Cornell, MIT, Rutgers) où interagissent linguistes et philosophes, un pont systématique entre les deux disciplines n'a jamais été construit. L'objectif de ce projet est d'établir en France une tradition durable de recherche collaborative interdisciplinaire, afin d'obtenir des avancées significatives sur les questions ayant trait à la référence et à l'ontologie et de produire en ce domaine un ensemble de publications exemplaires.

The project aims to establish a new direction of research in the interface between linguistic semantics and those areas in philosophy that are concerned with reference and ontology, namely metaphysics (contemporary and ancient), philosophy of language (contemporary and medieval), and philosophy of mathematics. While linguistic semantics has made enormous progress in the last thirty years in the range and refinement of its empirical research, it has developed quite separately from philosophy of language, metaphysics, epistemology, and philosophy of mathematics. This is highly unsatisfactory, especially for questions dealing with ontology, which cannot be answered without the cooperation of linguistics and philosophy, and more particularly for questions regarding reference to abstract objects, which can hardly be addressed seriously without taking into account the various approaches in the philosophy of mathematics. While there are a few places in the US with some interactions between linguists and philosophers (Cornell, MIT, Rutgers), a systematic bridge between the two disciplines has never been built. The objective of the project is to establish in France a long-term tradition of collaborative interdisciplinary research, in order to obtain significant advances on questions dealing with reference and ontology and to produce a range of exemplary publications.

B2 - RESUME DU PROJET (1 page maximum)

The project aims to establish a new direction of research in the interface between linguistic semantics and those areas in philosophy that are concerned with reference and ontology, namely metaphysics (contemporary and ancient), philosophy of language (contemporary and medieval), and philosophy of mathematics. While linguistic semantics bears inherently a close connection to many issues in ontology and while many philosophers concerned with problems in ontology make appeal to 'intuitions' and linguistic examples, a bridge between the philosophical and the linguistic tradition has never been build in a systematic way, and it is the purpose of the project to do so.

A dominant contemporary philosophical tradition, due to Frege, is to tie the entities presupposed by a language to its referential terms, which consequently leads to a wealth of abstract and derived entities as part of the domain of the language. This view faces various challenges from other disciplines: from recent semantic research, which challenges many cases of apparent referential terms, from syntactic theory, which makes use of other distinctions based on its own syntactic criteria, from philosophy (metaphysics) itself, which tends to question the ranges of abstract objects natural language apparently makes reference to, and again from semantic research, which has questioned the 'object status' of various kinds of entities allegedly being referred to. Furthermore there are interesting historical and contemporary alternative approaches to what has been considered instances of referential terms, such as medieval theories of supposition, or contemporary deflationist views.

The project aims to develop new directions of research that arise from the confrontation from the various disciplines and traditions. The project is divided into three subprojects, the first one dealing with general problems of reference, the second one with ontological problems from the point of view of ancient, medieval and contemporary metaphysics, the third one applying the methods of philosophy of mathematics to problems arising in semantics.

One guiding view that the project will pursue is that reference in natural language displays various degrees of objecthood and abstraction, ranging from 'weak reference' to 'mere portions of matter', sortal-relative reference to ordinary objects, reference to entities making use of partial abstraction (entities such as 'tropes' or 'qua objects'), and reference to fully abstract objects. Various analyses to be developed within this view can be related to similar ideas in ancient and medieval philosophy. Moreover, formal methods for modelling abstract objects of reference will be explored that are more familiar from philosophy, especially philosophy of mathematics, than linguistic semantics.

The project will involve the collaboration of the IHPST (philosophical logic, philosophy of mathematics) with the research group 'Sémantique and Modélisation' (natural language semantics), the research group 2522 in Lille (philosophy), the research group 'Savoirs, Textes et Langages' in Tours (philosophy) as well as various research centers outside of France, such as the Center of Ontology (Geneva), Amsterdam University (Betti), New York University (Fine), and the University of Edinburgh (Scaltsas).

Joint research seminars will be accompanied by doctoral and post-doctoral training at Paris I and at the ENS (Philosophy and Cognitive Science Departments). A website will be set up to provide participants scientific resources (primary data, databases, one-line articles) as well as information concerning the project itself (work in progress, discussion, conference and seminar announcements). Regular invitations are planned for foreign researchers to present their ongoing research at research seminars in Paris.

The objective is not only to produce 'exemplary publications' in the new area of research, but also to build a long-term tradition of collaborative interdisciplinary research in France.

B3 – CONTEXTE ET ETAT DE L'ART (1 page maximum)

(On précisera, en particulier, la position du projet par rapport à la concurrence nationale et internationale, en donnant les références nécessaires)

In the last thirty years, linguistic semantics has developed enormously as a discipline, in particular in the scope and the refinement of its empirical research. Linguistic semantics is also inherently connected to many philosophical issues, not only in the philosophy of language, but also in metaphysics and epistemology. The border to ontology is particularly important: In order to achieve its main goals, giving a formal account of intuitively valid inferences and semantic acceptability within a compositional semantic analysis, linguistic semantics posits formal models involving entities of different sorts and in different ways. Not only does this require a domain of objects of reference for the evaluation of referential noun phrases and quantifiers; semanticists also frequently posit entities as implicit arguments, as values of anaphora, and as contextual parameters.

Despite the inherent close connection between linguistic semantics and philosophical issues, there is very little interaction between the two disciplines. Linguistic semantics has in the last twenty years developed quite separately from philosophy, almost entirely ignoring contemporary as well as historical work in metaphysics. In philosophy, on the other hand, after an antimetaphysical period in the first half of the 20th century, there has been a recent revival of metaphysics, especially ontology, with philosophers such as Kit Fine, David Armstrong, Peter Simons, Jonathan Lowe to name just a few. A lot of this more recent work in metaphysics in fact provides exciting challenges and new perspectives for semantic issues. It is not just contemporary metaphysics, though, that is of interest for linguistic semantics, but also the wealth of discussions found in ancient, medieval, and early modern philosophy.

There is also a significant, though hardly ever exploited connection between the philosophy of mathematics and linguistic semantics (a rare exception being found in the work of Thomas Hofweber). Mathematics is a discipline that, it seems, is about numbers and other abstract objects, using referential terms (number words and others) to refer to them. In mathematics, the proliferation of abstract objects is even more obvious than in the context of natural language and constitutes a central issue in the philosophy of mathematics. Quite astonishingly, though, the discussion and approaches developed in the philosophy of mathematics have never been applied to issues arising in linguistic semantics concerning reference to abstract or derived objects. It is of course of great interest to see to what extent the same or similar strategies are involved in the two areas.

Whereas in some places in the US there is some interaction between philosophers and linguists (for example MIT, Rutgers, and Cornell), in most universities in the US, as well as in Europe (such as the UK, Germany, and Holland) linguistic semantics has separated itself almost entirely from philosophy. France appears to provide a particularly good base for building the badly needed bridge between philosophy and linguistic semantics for two reasons: first because of its great number of fulltime researchers and second because many French semanticists already take a significant interest in philosophy (as can be seen from the various discussion groups within the GDR 'Sémantique et Modélisation').

Linguists in general will benefit from the interdisciplinary bridge in that having a much greater range of conceptual and philosophical views at one's disposal allows for more interesting, explanatory and adequate linguistic analyses. Philosophers on the other hand will

benefit from it in that semantic analyses of philosophically relevant data can themselves shed a significant light on the philosophical issues at hand.

B4 – DESCRIPTION DU PROJET (4 à 6 pages)

(On indiquera notamment clairement les objectifs poursuivis dans le projet proposé et ses enjeux scientifiques)

The topic of the project, the relation between ontological structure and semantic structure, can be divided into three major subprojects, which again divide into different themes:

Subproject 1: The Notion of Reference: Philosophical and Linguistic Aspects

This subproject will deal, from a linguistic and a philosophical perspective, with the central notion of a referential term and its challenges, with the status of entities as objects when they act as values of referential terms, and with alternative views of reference, including medieval theories of terms.

Subproject 2: The Ontology of Objects of Reference

This subproject deals with semantic perspectives and perspectives in contemporary, ancient and medieval metaphysics on objects of reference that are of an abstract or derived sort.

Subproject 3: Abstract Objects as Objects of Reference

This subproject deals with reference to what seem to be truly abstract objects, from the perspective of the philosophy of mathematics as well as from the perspective of linguistic semantics, and it explores how methods of the former might be used for the latter.

1. The Notion of Reference: Philosophical and Linguistic Aspects

1.1. The Fregean notion of a referential term

How can we tell what the objects are that a language involves or makes reference to?

The point of departure of the project will be one important tradition concerning the relation between ontology and linguistic structure, due to Frege (1884, 1892): the objects a language involves are just the entities certain kinds of expressions may stand for, namely expressions that are referential terms. The Fregean tradition is an influential tradition not only in the philosophy of language but also in the philosophy of mathematics (Wright 1983, Hale 1987). The notion of a referential term itself is formally characterized by a number of criteria, for example by the ability of a term to flank the two sides of an expression of identity (Hale 1987). Thus, the subject terms in the identity statements below will count as referential terms and hence stand for objects of some sort:

proper names, 'ordinary' descriptions:

(1) a. John is the man I was talking to.

b. The man over there is the man I was talking to yesterday.

nominalizations:

(1) c. Humility is the virtue that is the most underestimated.

d. That John is wise is the belief Mary has had for a long time.

functional constructions:

(1) e. The number of planets is nine.

f. The way John walks is the same as the way Mary walks.

The Fregean criterion leads to a wealth of abstract and derived entities as part of the domain of the language. It implies not only that proper names and ordinary descriptions stand for objects, but that nominalizations like humility and that John is wise do so as well: such terms obviously would refer to abstract entities of some sort (property-like or proposition-like objects). Also number descriptions like the number of planets as in (1e), as well the numeral nine itself appear to classify as referential terms, referring to numbers as objects. Finally, a construction like the way John walks will classify as a

referential term, referring to a quality of some sort. While the Fregean view obviously has consequences for metaphysics (implying reference to properties or propositions), it has also been given extensive attention in the context of philosophy of mathematics, as it seems to imply reference to numbers as objects (the NeoFregean view of Wright and Hale).

1.1. Challenges to the Fregean notion of referential term

The Fregean view, according to which the objects a language presupposes are just the entities that referential terms may stand for, faces various challenges, which the project (Subproject 1) aims to address.

Challenge 1: referential terms and recent syntactic theory

First of all, the notion of a referential term itself raises serious questions: it is characterized solely in terms of philosophers' criteria without any attempt of linking it to current notions in syntactic theory, such as that of a 'referential NP' or 'DP' or Rizzi's (1990) notion of a D-domain.

Task 1 of Subproject 1 is to confront the way the Fregean criterion is used in philosophy with current theories and practices in (especially generative) syntactic theory and to reevaluate classifications of referential terms in that light.

Challenge 2: problems for standard classifications of referential terms

The Fregean criterion has also been challenged in numerous instances of application. These are two examples:

[1] In my previous work (Moltmann 2003a, b, 2004b), I argued that that-clauses do not in fact act as referential terms, but rather are syncategorematic expressions, contributing to the expression of a complex property by a complex predicate. Given this view, a great part of the philosophical discussion about propositions turns out to rest on a mistaken linguistic analysis of that-clauses.

[2] Romero (2005) has recently argued that an NP like the number of planets in a specificational construction as in (1e) the number of planets is nine is in fact an indirect question (an intensional NP), rather than a referential term. This means the sentence (1e) would in fact express an identification of an intension with another intension, the meaning of the adjectival numeral (as in nine planets), rather than the identification of one abstract object with another (see also Hofweber, to appear). Given this view, a lot of the discussion in the philosophy of mathematics of numbers as objects appears to rest on a mistaken linguistic analysis of sentences like (1e).

A second aim of the first subproject is to fully explore the consequences of a linguistic reanalysis of philosophical key examples involving apparent referential terms.

Challenge 3: the object-status of the semantic values of referential terms

In a number of cases, referential terms, it has been argued, do not really stand for objects, but for entities of a 'weaker' sort. These are three examples:

[1] In previous work, I argued that a 'bare mass noun' like *humility* does not stand for an abstract object, but for a 'kind of trope', an entity which unlike ordinary objects must inherit its properties from the tropes (property manifestations, cf. Williams 1953) that instantiate it (Moltmann 2004a,c). Somewhat related contemporary linguistic views take bare mass nouns such as *humility* not even to be referential, a view found already in the medieval literature (Ockham).

[2] Definite plurals like *the children* would count as referential terms, and they are treated as such in the influential tradition of Link (1980) (though there are interesting nonreferential

analyses as well). In previous work, I argued that definite plurals stand for group-like entities that have a weaker status than objects, just like the kind of entity humility stands for (Moltmann 2004c).

[3] Nunberg (1984) and Lasersohn (2000) have argued that NPs like the same car do not refer to actual objects, but to 'pragmatic representatives' of actual objects.

In fact, some linguists believe that referential terms do not directly stand for actual objects at all, but representatives in 'models' (Zimmermann 1999, somewhat similarly Chomsky).

Task 3 of Subproject 3 is to explore the various semantic motivations and cognitive and philosophical implications of positing entities other than actual objects as values of referential terms. This part of the project will also concern itself with approaches that allow referential terms not to stand for objects at all such as deflationist theories of reference in the tradition of Carnap (1956), theories making use of free logics such as recently Sainsbury (2005), or Schiffer's (2003) view according to which referential terms may stand for 'pleonastic' entities.

Challenge 4: weakly referential terms

Another task of Subproject 1 is to explore a new, philosophically highly interesting category of what I will call weakly referential pronouns, such as French *ce* or English *this* or *that*.

A common assumption in the philosophy of language (at least since Frege) has been that a referential term provides both reference and a criterion of identity for the entity it stands for, especially with a sortal such as *woman* (as in *this woman*). Weakly referential pronouns do not conform with this: they do not themselves involve a sortal; they allow the sortal to appear in the predicate instead:

(2) a. This is a beautiful woman. 'C'est une belle femme.'

(2b) shows that pronouns like *this* (as opposed to *this woman*) do require a sortal in that they do not tolerate an adjectival predicate alone (Beysade/Sorin 2005):

(2) b. This is beautiful. 'C'est belle.' (looking at a woman)

Whatever referential intentions a speaker may have, it is impossible for him to refer with *this* in (2b) to a person. The account to pursue is that weakly referential pronouns involve indeterminate reference without identity, to a 'mere portion of reality' (Dummett 1973), with reference being completed only within the semantics of the entire sentence. This can be tied to the observation that weakly referential pronouns are the only terms truly acceptable in 'relative identity' statements, as in (2c), which play a key role in metaphysical discussions about identity (Geach 1962):

(2) c. This is the same woman as that. (looking at two photographs)

Task 4 of Subproject 1 will include a cross-linguistic investigation of weakly referential pronouns and an exploration of the philosophical ramifications of their semantics, especially for the discussion of relative identity. It also will involve a clarification of the philosophically central notion of a sortal (Geach 1962, Dummett 1973) from the point of view of recent semantic and syntactic theory.

Challenge 5: nominalizations

Nominalizations provide another sort of challenge to the traditional notion of a referential term. The process of nominalization broadly understood takes an expression that is not a noun or referential NP and maps it onto a noun or referential term. The striking feature about natural language is that nominalization is applicable in principle to almost any nonreferential category leading to new referential terms:

(3) a. humility (adjective nominalization), fatherhood (nominalization of relational noun),
walk, stay (nominalizations of verbs), aboutness (nominalization of adjective)

Moreover, nominalizations may themselves take part in functional constructions, leading to terms of a further degree of abstraction:

- (3) b. the kind of honesty Mary displays, the quality of Mary's stay, the extent of Mary's beauty, the degree of Mary's anger, the difference between Mary's and Bill's intelligence

The objects that nominalizations (and the relevant functional constructions) may stand for appear to be of a range much greater than most philosophers (and nonphilosophers) are willing to accept: They include not only what looks like properties and propositions, but also events, modes, ways, qualities, extents, degrees, 'results', beliefs etc. The range of nominalizations and related functional constructions that natural languages display in fact makes the ontology of natural language appear rather close to that of mathematics, with entities being introduced apparently 'by construction', rather than being available from a previously accepted and established domain.

The final task of Subproject 1 is to explore in what ways nominalizations are able to introduce 'new entities', in such rather unlimited ways, by paying particular attention to the linguistic form of the newly formed referential terms themselves. My approach will be that this happens in three ways: by 'partial abstraction' (Section 2.1.), 'by construction' (Section 3.2.) and as truth makers (Moltmann, to appear).

1.2. Alternative views of reference

1.2.1. Medieval theories

The interest in medieval (and other historical) views of reference is two-fold:

[1] Contemporary semantic and philosophical research may shed a new light on the interpretation and understanding of historical views

[2] The historical views themselves inspire and provide a fresh look at the semantic or philosophical problems at hand (see Moltmann 2004a for an example).

The nominalist theories of late Middle-Age (Ockham and Buridan), for example, used various semantic tools in order to defend a parsimonious ontology. The ultimate significata were singular entities and the meaning of the abstract terms was reduced to the meaning of concrete terms. This reduction was achieved by a complex semantic analysis of, for example, connotative and relational terms. More realist theories, on the other hand, were more inclined to accept that certain phrases refer to abstract entities and were not reducible to the meaning of singulars items (Burley's conception of a 'real proposition' is a good example of that).

1.2.2. Other ways of introducing entities than by referential terms

Semanticists often posit (abstract) entities also in the absence of a referential term, namely:

[1] as implicit arguments, [2] as parameters for the contextual evaluation of sentences, often introduced in the presence of certain (modal, temporal) operators, [3] as values of anaphora (Asher 1993), and [4] in the case of tropes and events, as truth makers (Armstrong 1987, Mulligan/Simons/Smith 1984, Moltmann, to appear). The question to be pursued in this subproject is: Do entities that have been introduced into the semantic structure of sentences as implicit arguments, as parameters of the contextual evaluation of sentences, as values of anaphora, or as truthmakers have the same ontological status as entities that act as semantic values of referential terms?

2. The Ontology of Objects of Reference

Once the objects of reference or objects otherwise introduced into the semantic structure of natural language have been identified, another important task is to develop a formal ontology for them, to account for their most general properties and their relations to each other or to the

linguistic base used to introduce them. Developing a formal ontology for certain domains of objects is an enterprise not at all unfamiliar in linguistic semantics. However, it is striking how limited the formal means are that semanticists traditionally make use of (set theory, extensional mereology, possible worlds and time intervals). Subproject 2 aims to explore and develop a much richer formal and conceptual repertoire for accounting for the various kinds of objects involved in the semantics of natural language (and possibly some of its extensions).

2.1. The importance of the linguistic data: degrees of abstraction

Philosophers commonly think that nominalizations and relevant functional constructions refer to abstract objects, of the sort of properties, propositions, degrees, or numbers. In view of a greater range of linguistic data, this assumption appears to be largely mistaken: the core of nominalizations and functional constructions do not refer to truly abstract objects, but objects that are in a sense still concrete, objects of the sort of tropes (Williams 1953, Simons 1994) or 'qua objects' (Fine 1981), obtained, it appears, by partial abstraction from concrete individuals. This is illustrated with the terms in (5a), (6a), and (7a), allegedly referring to abstract objects, but clearly showing differences in the kinds of properties they can have with respect to fully abstract objects, the objects of reference in (5b), (6b), and (7b):

(5) properties

- a. John's friendliness is nice / interesting /unusual.
- b. ?? The property of friendliness John has is nice.

(6) proposition

- a. John's thought that S is daring / shocking / unexpected.
- b. ?? The proposition that S is daring / shocking / unexpected.

(7) numbers

- a. The number of people exceeds / is less than the number of animals.
- b. ?? The number five exceeds / is less than the number six.

Such data indicate that natural language exhibits various degrees of abstraction with core expressions still making reference to concrete, though derived objects (tropes, concrete beliefs, collections 'qua numbering five') and only expressions of a somewhat technical vocabulary making reference to purely abstract objects (the property of friendliness, the proposition that S, the number five). The ontological picture this suggests is one closer to various ancient and medieval views than the dominant contemporary ones. For example, in Aristotle's *Categories*, tropes (accidents, substantial forms) constitute one of four categories besides universals and substances.

This subproject aims to fully develop the view of language making use of partial abstraction and intends to relate it to various historical and contemporary philosophical ideas.

2.2. Ancient and medieval views of tropes and universals and of objects

The ancient and medieval controversies about universals are well known, yet it can be very interesting to take a new look at them from the point of view of contemporary semantics and philosophy. Medieval theories contain many interesting semantic reflections on the status of qualities, universal as well as particular. In Ockham, for example, the problem of qualities is linked to the question of relations by reducing the meaning of relational terms to the 'conjunction' of particular qualities. Moreover, the Prophyrean notion of an individual has led to the discussion of a mereological approach of the individual as a sum of qualities as opposed to the view that a substance might be inaccessible to sense experience, while at same time supporting the various qualities it has.

3. Abstract Objects as Objects of Reference

3.1. Abstract Objects in mathematics

The doctrine of abstraction is a long-standing tradition within an anti-platonistic approach of mathematics: Instead of admitting mathematical terms as standing for genuine 'complete' objects similar to the usual objects, one has tried, after Aristotle, to think of mathematical objects as the result of a process of *aphaïresis*. Given the well-known difficulties of that kind of abstractionism (what are the complete objects from which high cardinalities derive by such an abstraction?), there have been recent attempts to vindicate the general idea of abstraction in another way, as the outcome of an inquiry on the borderline of logic, semantics and philosophy of mathematics. That modern way, deeply connected to the fundamental issues of the present research project, is grounded in the Fregean analysis of the concept of a parallel (the notion of 'direction' is just obtained from the notion of parallel lines by means to abstraction). Given this, some crucial questions arise that are of common interest for semantics, ontology and philosophy of mathematics: is it eventually possible to build a Fregean programme on some version of 'Hume's principle'? Could we conceive ways of abstraction that are not 'inflationary', namely so that the resulting abstracta are not more numerous than the basic objects from which they are abstracted? Is it possible to define mathematical 'objects' explicitly on the basis of logical or non-mathematical notions? If such a programme can be achieved, what are the lessons to be drawn for the general notion of abstract reference? As part of the project, the research group in philosophy of mathematics approach will investigate the two sides of the question, dealing both with a thorough evaluation of the 'neo-Fregean' approach to numbers and with a possible extension of that approach to a general theory of abstract reference.

3.2. Novel approaches to abstract objects of reference

To account for ontological distinctions, semanticists traditionally use formal means (set theory, extensional mereology) with which they distinguish entities in terms of internal structural differences. This, however, does not give justice to some crucial distinctions the ontology of natural language displays. For example, the difference between humility and the property of being humble does not so much reside in the internal structure between two sorts of universals, but in the way the universals bear properties (Moltmann 2004a, c): whereas humility inherits its properties from its instances (John likes humility because he likes humble behavior), the property of being humbles bears properties directly (John like the property of humility because he likes the abstract object). This distinction cannot be represented in terms of internal differences among universals, but requires an approach in terms of implicit definition: humility as an entity needs to be understood in terms of the way predicates apply to it to yield true propositions. Implicit definition is a method explored thoroughly for abstract objects in the context of mathematics, but has hardly been explored by semanticists. This method will also be fruitful to explore for the ontology of 'complex' abstract objects, such as facts, propositions, and complex properties, which, in the context of natural language and elsewhere, never behave as if their 'constituents' are natural parts of them (see Schiffer (2003) for a philosophical approach along these lines).

Task 2 of Subproject 3 consists in exploring in a systematic way whether and how such an approach can be developed for the ontology of fully abstract and 'derived' objects in the context of the semantics of natural language.

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