Abstract Objects and the Semantics of Natural Language

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Preface

This book discusses semantic and philosophical issues regarding abstract objects that involve a number of different natural language constructions. These constructions lend themselves to a unified overall view, namely one on which particulars such as tropes play a more central role and abstract objects generally have a derivative status. Part of this unified account is the semantic analysis of a particular type of expression that recurs in almost all the constructions the book discusses, namely special quantifiers such as *something, everything*, and *several things*. These quantifiers can take the place of various non-referential occurrences of expressions and will be analyzed as nominalizing quantifiers, introducing entities of similar sorts in the different constructions in which they may occur. Despite the aim of giving a unified semantic account, though, the chapters of this book can be read more or less independently from each other.

The account this book develops is related to a number of papers published over almost ten years, starting in 2003. It shares general ideas of the earlier analyses, but yet differs significantly in its overall development and in a great variety of details. Chapter 1 is related to both Moltmann (2004b) and Moltmann (2005), but gives a significantly different account of the distinction between the terms *wisdom* and *the property wise*, by making use of plural reference for the former. Chapter 2 relates to Moltmann (2007), which explores the notion of truthmaking for the semantics of adverbial modifiers. This chapter no longer makes use of that notion for the semantics of events (and tropes), but returns to the Davidsonian view, according to which events are implicit arguments of verbs (and tropes implicit arguments of adjectives). A notion of truthmaking will be used, though, for a different purpose in Chapter 5. Chapter 3 is related to Moltmann (2003a) and Moltmann (2004a), but differs significantly in the ontology that it associates with nominalizing quantifiers. Chapter 4, which develops an account of attitude reports on the basis of multigrade predicates and the notion of an attitudinal object, is a significantly further development of Moltmann (2003b), both regarding the motivations for the account and the account itself. Chapter 6, which gives a general outline of the syntax and the semantics of "reifying terms," is related to Moltmann (forthcoming b), which focuses on analysis of one particular reifying term, namely of the sort *the number eight*.

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Introduction

Abstract objects have been at the center of philosophical debates since antiquity, raising longstanding ontological and epistemological problems. Philosophers have pursued various Platonist and nominalist views about abstract objects, appealing to metaphysical considerations, considerations regarding mathematics or science, and, not infrequently, intuitions about natural language. This book focuses entirely on natural language and pursues the question: In what way, if any, does natural language allow for reference to abstract objects? What distinguishes its approach from ordinary language philosophy is the way it makes systematic use of contemporary research in linguistic semantics as well as syntax and explores a much greater range of data and linguistic generalizations than are generally taken into account in philosophy. This book thus pursues "descriptive metaphysics" (as opposed to "revisionary metaphysics") in a fully systematic way, to use Stawson's terms. The result is an ontological picture that differs greatly from the one taken for granted by philosophers as regards natural language. Moreover, it differs in many ways from views that are dominant in current linguistic semantics. The book establishes a range of new linguistic generalizations that fit better with some philosophical views, ancient or new, that so far have found little entrance into semantic theories of natural language.

The common view about natural language (shared by philosophers and linguists alike) is that natural language allows rather generously for reference to abstract objects. The range of abstract objects that natural language seems to allow reference to is rather large and varied. Five major classes of expressions or occurrences of expressions apparently referring to abstract objects can be distinguished:

[1] Noun phrases with nominalizations or functional nouns as heads
Socrates' wisdom, the redness of the apple, the height of the building, the extent of Mary's happiness, the number of planets, John's belief that it is raining

[2] Bare plurals and mass nouns and other kind terms
Noun phrases of the sort *giraffes, water, wisdom, the belief that it is raining, the desire to become rich*

[3] (Occurrences of) Expressions in subject or complement position that are not referential noun phrases
Predicative complements, intensional NP-complements, *that*-clauses, bare numerals

[4] Special quantifiers and pronouns
Quantifiers and pronouns that can take the place of (occurrences of) expressions that belong to [2] and [3] such as *something, everything, nothing, several things, that*, and relative clauses with *what*.

[5] "Reifying terms"
Noun phrases that introduce an abstract object on the basis of a non-referential (occurrence of an) expression with the help of a sortal such as *the fact that it is raining, the property of being wise, the number two, the color green, the kind human being, the name John, the truth value true*

The expressions of those classes apparently act as singular terms, fulfilling standard criteria for singular termhood. Therefore they should stand for objects—and the common view is that they stand for abstract objects. Thus, given Fregean as well as Quinean criteria of ontological commitment, natural language appears committed to a great range of abstract objects, which include properties, kinds, propositions, facts, degrees, numbers, and expressions. The impression that natural language involves such a rich ontology of abstract objects has led many philosophers to dismiss natural language as a suitable guide for ontological issues or else just not to take it seriously in the first place as a medium reflecting "what there really is."

This book arrives at a very different picture of the ontology of abstract objects reflected in natural language. Reference to abstract objects in natural language is considerably more limited than usually thought, and most types of terms apparently referring to abstract objects should in fact be accounted for differently than on standard analyses. More specifically, none of the expressions above except for "reifying terms" involve reference to abstract objects.

The terms in class [1] are in fact terms referring to particulars, though particulars of other types than are usually recognized in linguistic semantics. Such particulars include tropes ("particularized properties"), quantitative tropes, number tropes, and "attitudinal objects" (truth-bearing, mind-dependent objects).

The terms in class [2], I will argue, are not terms referring to single objects, kinds in some sense, but are plurally referring terms, standing for the various instances of the kind at once. The class also includes bare adjective nominalizations of the sort *wisdom*. *Wisdom*, I will argue, is in fact not a term referring to a property, but rather a term plurally referring to the various instances of wisdom, namely tropes.

The terms in class [3], I will show, are not referential terms at all, rather they have a non-referential function that only together with a predicate leads to a semantic contribution to the sentence.

The special quantifiers in class [4] make up a recurrent theme throughout this book. Special quantifiers are highly relevant philosophically. Not only have they been used on many occasions to argue for quantification over or reference to abstract objects, such as properties, propositions, numbers, or intensional quantifiers. They also occur in many examples of intuitions that philosophers appeal to, as when arguing for the

need for propositions and when talking about "the things people believe," "what is said," or "what an expression means." I will show that philosophers were largely misled by what they take the semantics of special quantifiers and pronouns to be. Special quantifiers and pronouns do not range (or almost never range) over abstract objects. Rather, they generally range over tropes or pluralities (kinds) of tropes or over "variable objects" that have particulars as their manifestations. Special quantifiers and pronouns have a special kind of semantics: they do not take their values from a given domain of entities, but have a nominalizing function, that is, they establish a "new domain" of entities to quantify over or to refer to.

The expressions in class [5] do allow for reference to abstract objects. However, the abstract objects such terms may refer to have the status of derivative objects, reflected in the complex syntactic structure of the terms in this class. They are abstract objects introduced on the basis of a non-referential occurrence of an expression, the expression following the sortal, in roughly the sense of pleonastic entities or entities introduced by abstraction, entities introduced in ways more familiar from the philosophy of mathematics than from metaphysics.

The ontological picture reflected in natural language thus is one that is highly particularist. A great range of expressions that have been considered abstract terms in fact refer to particulars or pluralities of particulars, though of a greater range than usually admitted.

Very important in the ontology of natural language, as we will see, is the category of tropes or "particularized properties." Examples of trope-referring terms are *the wisdom of Socrates* and *the beauty of the landscape*, but also *the heaviness of the stone, the weight of the stone, the extent of Mary's happiness*, and *the number of planets*. Tropes are entities involving an older notion of "abstraction," a notion that involves (psychologically speaking) attending to only one aspect of a particular and abstracting from all the others. This form of abstraction yields not only particularized properties like "Socrates' wisdom," but also degree-like, extent-like, number-like, and proposition-like objects that may still be concrete entities.

There is another category of objects that plays a role in natural language, namely what I will call *variable objects*. These are objects that have different manifestations as possibly different objects in different circumstances (which need not include the actual ones). For example, *the book John needs to write* refers to a variable object. Variable objects are not abstract objects, though. They share properties of concreteness in particular circumstances with their concrete manifestations in those circumstances.

Making generous use of abstract objects in the analysis of natural language has become rather customary in linguistic semantics, where the use of sets, properties, propositions, degrees, and numbers as abstract objects generally is taken for granted. The examination that this book undertakes of what is actually going on with apparent reference to abstract objects in natural language thus challenges not just standard philosophical views about the ontology of natural language, but also various ontological notions that have become standard in natural language semantics.

Philosophers differ regarding how much attention should be paid to natural language and whether natural language can or should be a guide to ontological questions about "what there really is." This book does not aim to enter the debate as such. What it does show is what kind of ontology is in fact reflected in natural language, an ontology that differs radically from the one that philosophers (and linguistics) generally took natural language to involve. It shows that arguments from natural language for questions concerning in particular the ontology of universals, the ontology of numbers and degrees, and the ontology of propositions need to be fundamentally reconsidered: natural language as such does not give support for such objects, at least not in a central role. Instead, it gives support for tropes of a great variety of sorts not as such discussed in contemporary philosophical ontology.

1

Reference to Universals and Plural Reference to Particulars

Universals have been a central topic in metaphysics since antiquity, and ever since Plato made them a central topic in philosophical discussions, their ontological status has been under dispute. There have been diverging views not only about the existence of universals as such, but also about the ontological status of universals. Central in the debate is the question whether universals have the status of abstract objects or whether they have a "lesser" ontological status: as incomplete concepts, as "ways" inherent in particulars, or else as classes or pluralities of resembling particulars (or possible resembling particulars).

The present approach to these questions is to take a much closer look at natural language in order to answer the question if and how natural language in fact allows for reference to universals. The overall result will be that in natural language, reference to universals as abstract objects is much more marginal than has been commonly assumed. Natural language allows for reference to universals as abstract objects only with somewhat technical complex expressions such as *the property of being wise*. The more common and central terms in natural language apparently making reference to universals such as *wisdom* do not stand for abstract objects, but rather for kinds of particulars, that is, kinds of particularized properties or "tropes." Kinds of particulars in the required sense, moreover, should not be conceived as single objects, but rather as pluralities of "instances" (or possible instances). *Wisdom* thus refers plurally to the various possible instances of "wisdom," rather than standing for a single entity that is a property or kind, and similarly for other bare mass nouns and plurals (such as *water* or *giraffes*). Instead of reference to abstract entities that are properties or kinds, natural language shows a preference for plural reference to particulars (albeit possible particulars as well).

In addition to drawing the distinction between two kinds of terms for universals, this chapter will argue for a particular way of understanding terms for kinds of particulars as plural terms, namely on the basis of plural reference. Plural reference means reference to different particulars at once, rather than reference to a single "plurality" of entities. Several parallels with ordinary plural terms support the status of kind terms as plurally referring terms.

I will first discuss a range of semantic differences between two kinds of terms for universals. The plural-reference approach will then be introduced for definite plurals

and with some modification be carried over to bare plurals and mass nouns and to bare nominalizations such as *wisdom* in particular. Finally, I will sketch an account of terms that do refer to properties as abstract objects such as *the property of being wise*, an account that I will take up again and develop further at later points in this book.

1. Two kinds of terms for universals

English, and to a great extent natural languages in general, allows for reference to universals with two kinds of constructions:

[1] Bare adjective nominalizations
Nominalizations of adjectives when occurring without a determiner such as *wisdom, happiness, redness,* and *heaviness*

[2] Explicit property-referring terms
Constructions of the type *the property of being wise* or *the property of wisdom*

Not much attention has been paid, though, to the nature of the universals that such terms apparently stand for. There is just agreement that such terms are referential and thus should not stand for unsaturated entities (concepts) in the Fregean sense. Both kinds of terms seem to fulfill standard criteria for referential terms. They can occur with predicates (in subject and in object position) with which also clearly referential terms can occur. They also fulfill the various Fregean and neo-Fregean criteria for referential terms (Hale 1987). Thus, the two kinds of terms seem to be able to "flank the identity sign," as Frege puts it:

(1) a. Mercy is the property that Stalin most perspicuously lacked.

Moreover, both kinds of terms can be replaced by quantifiers, in particular by the quantifier *something*, as in the valid inferences below:[1]

(1) b. Stalin lacks mercy/the property of mercy.
Stalin lacks something.

The common view is that both kinds of terms stand for properties that are abstract objects.[2] I will argue that this view is fundamentally mistaken with respect to bare adjective nominalizations. Bare adjective nominalizations, I will argue, do not refer to single objects that are universals, but rather stand for the pluralities of what would be the instances of the universal, namely tropes or particularized properties. I will make use of the notion of plural reference explored more recently by a number of philosophical logicians. According to that notion, a plural term does not stand for a single

[1] For tests that are more sophisticated involving inferences with quantifiers see Hale (1987).

[2] This view is made particularly explicit in Loux (1998, p. 31 ff.). Other philosophers try to re-analyze such terms or sentences involving them in terms of reference to particulars only (see Loux 1998 for discussion), or else they dispute their referential status (for example Dummett 1973, Chapter 4).

entity that is a plurality, but rather plurally refers to several individuals at once. Given plural reference, bare adjective nominalizations plurally refer to what would be the various possible instances of the universal, that is, they do not refer to a collection of instances as a single entity. Bare adjective nominalizations thus are plural terms, but they are not plural terms that stand for actual pluralities, but terms that stand for what I will call *modalized pluralities*, that is, pluralities that include actual and possible individuals.

The instances in the case of bare adjective nominalizations, I will argue, are tropes, that is, particular manifestations of properties in individuals. Bare adjective nominalizations thus are terms plurally referring to actual and possible tropes. I will call this the *plural-reference account* of bare adjective nominalizations.

Syntactically, bare adjective nominalizations are bare mass nouns just like *water* or *gold*. Their mass status manifests itself in the kinds of determiners they allow (*much* and *little* rather than *many* or *few*) as well as the fact that they do not allow for the plural. Bare mass nouns along with bare plurals (such as *giraffes*) generally are considered terms that stand for kinds, at least on some of their occurrences. The kinds may be natural kinds, as in the case of *water* or *giraffes,* or kinds in an extended sense, as in the case of *embroidery* or *chairs*. The plural-reference account of bare adjective nominalizations carries over straightforwardly to underived bare mass nouns and plurals allowing for a unified plural-reference account of terms for kinds of quantities (*water*), kinds of individuals (*giraffes*), and kinds of tropes (*wisdom*).

While reference to pluralities of instances accounts for bare mass nouns and plurals as well as some other kind terms, there are also terms that refer to kinds as objects rather than referring plurally to the various instances. Examples are *the kind human being* and *the Siberian tiger*. Such *kind-referring terms*, as I will call them, need to be distinguished from the terms that stand for kinds as pluralities of instances, which I will call *kind terms*. Thus, we have the following distinction:

[1] Kind terms
Bare mass nouns and plurals referring plurally to the various instances

[2] Kind-referring terms
NPs of the form *the kind human beings* or *the Siberian tiger*, referring to kinds as single entities

Conceiving of universals as pluralities of their instances constitutes one way of reducing universals to particulars. There is a second way that has been pursued by nominalist philosophers and that is by reducing universals (or properties) to the application conditions of a corresponding predicate. I will argue that there is a construction in natural language that reflects precisely such a strategy as well, namely explicit property-referring terms such as *the property of being wise*. Explicit property-referring terms do not stand for pluralities of instances of universals, but rather, as I will argue, serve to introduce derivative "property objects" individuated on the basis of semantic conditions governing the use of the corresponding predicate. This is what is

reflected in the linguistic form of explicit property-referring terms, which are complex terms consisting of a sortal (such as *property*) and an expression closely related to a predicate (such as *being wise*). The derivative status of property objects is also reflected in the somewhat marginal status of explicit property-referring terms. Whereas adjective nominalizations belong to the core of the everyday use of language, explicit property-referring terms belong to what one may call the *periphery* of language: they are rather technical terms and hardly indispensable for making non-technical (i.e. non-philosophical) statements.

Traditionally, the two kinds of terms for "adjectival" universals, bare adjective nominalizations and explicit property-referring terms, have been taken to refer to the same entities: properties that have the status of objects. In fact, in a number of contexts bare adjective nominalizations and the corresponding explicit property-referring terms are interchangeable:

(2) a. John has wisdom.
    b. John has the property of being wise.

(3) a. Wisdom is a property only few people have.
    b. The property of being wise is a property only few people have.

(4) a. Honesty is my favorite attribute.
    b. The property of being honest is my favorite attribute.

(5) a. Humility is a virtue.
    b. The property of humility is a virtue.

(6) a. John's suggestion exemplifies wisdom.
    b. John's suggestion exemplifies the property of wisdom.

However, bare plurals and mass nouns differ fundamentally in their semantics from explicit property-referring terms. These differences manifest themselves with various classes of predicates as well as in the choice of pro-forms and quantifiers that can replace the terms. Because of the particular view that the semantic behavior of bare mass nouns and plurals has given rise to, I will call it *kind term behavior*. That is, bare plurals and mass nouns, but not explicit property-referring terms, exhibit kind term behavior. I will argue that those differences cannot be accounted for by an ontological distinction between kinds and property objects, but require abandoning an account entirely according to which bare plurals and mass nouns act as terms referring to single entities that are kinds. Only plural reference, not reference to a single object (a kind), can adequately explain the characteristic behavior of bare plurals and bare mass nouns.

Aside from kind term behavior, there are some striking parallels between definite plurals on the one hand and bare plurals and mass nouns on the other hand that the plural-reference account of bare mass nouns and plurals can straightforwardly explain, as we will see.

2. The kind term behavior of bare adjective nominalizations

What I call *kind term behavior* consists, first, in the particular readings that bare plurals and mass nouns trigger with different kinds of predicates. It also manifests itself in the choice of quantifiers in place of bare plurals and mass terms.

In linguistic semantics, it has long been observed that bare plurals and mass nouns display different readings with different kinds of predicates (cf. Carlson 1977, Chierchia 1998). In particular, they display an existential reading with predicates describing particular events, that is, *episodic predicates* (or "stage-level predicates," as Carlson 1977 calls them):

(7) a. John found gold.
b. John bought apples.

Moreover, they display a universal or generic reading with predicates describing a permanent property, that is, *characterizing predicates* (or "individual-level predicates," as Carlson 1977 calls them):

(8) a. Gold is shiny.
b. Apples are healthy.

Bare mass nouns and plurals display a special behavior also with intensional verbs such as *need* (Carlson 1977):

(9) a. John needs gold.
b. John needs apples.

The crucial observation is that (9a) and (9b) allow only for an intensional reading, not an extensional one (i.e. one on which (9b) would mean "there is a particular collection of apples *d* such that John needs *d*") (cf. Carlson 1977). The intensional reading that *need* in (9a, b) displays can be paraphrased in terms of quantification over possible objects. That is, (9a) says that John's needs are satisfied only if he has some (possible) quantity of gold, and (9b) that John's needs are satisfied only if John has some (possible) quantity of apples.

With the verb *exist*, bare plurals and mass nouns lead to a claim about the existence of instances:[3]

(10) a. Yellow roses exist.
b. Three-legged dogs exist.

[3] The observation that a sentence like (11a) claims the existence of instances only has been made independently by Strawson (1953–4, 1959) and Wolterstorff (1960, 1970, Chapter 7).

Sentences like (10a) and (10b) in particular cannot claim the existence of the (sub-)kind independently of the instances (as something that may not have instances).

Finally, bare plurals and mass nouns allow for what in general are considered genuine kind predicates such as *extinct, rare*, and *widespread*:

(11) a. Dinosaurs are extinct.
b. Pink diamonds are rare.
c. Pigeons are widespread in Europe.

Such predicates characteristically count or otherwise measure the distribution of the instances of the kind, possibly across different times and different actual and counterfactual situations. Let me call those predicates *instance-distribution predicates*.

Linguists are divided as to how to treat the two readings that bare plurals and mass nouns display with episodic and characterizing predicates. One account takes bare plurals and mass nouns to be ambiguous between acting as existential quantifiers ranging over individuals or quantities and acting as singular terms referring to kinds (cf. Diesing 1992, Kratzer 1995, Krifka et al. 1995, Longobardi 2001, Krifka 2004). Another account takes bare plurals and mass nouns always to act as terms standing for kinds, relegating the appearance of the two readings to the interpretation of the predicate (cf. Carlson 1977, Chierchia 1998).

There is significant evidence for both views. Evidence for the first view includes the observation that languages such as French, which do not allow bare plurals or mass nouns, distinguish the two readings rather sharply. Whereas French expresses the generic reading by a definite NP, it expresses the existential reading by a partitive:

(12) a. Les roses/??? Roses sont rouges.
"Roses are red."
b. Jean a vu des roses/??? roses.
"John has seen roses."

At the same time, there is significant evidence for the second view. This includes the observation that bare plurals allow for co-predication of predicates that would lead to different readings of the bare plural:

(13) a. Pink diamonds are rare, precious, desired by many, and owned by only few.
b. White gold is rare, precious, desired by many, and owned by only few.

In addition, quantifiers such as *something,* which, as will be discussed shortly, can replace bare plurals and mass nouns, allow for modifiers with conjoined predicates that would lead to different readings:

(14) John found something that is rare, not often needed, and very expensive, namely pink diamonds/white gold.

In (14), *something*, replacing a bare plural or mass noun, relates (simultaneously) to an episodic predicate, an instance-distribution predicate, an intensional predicate, and an individual-level predicate, triggering the same readings as the bare plural or mass noun would have on its own.

In view of such data, a third view appears the most plausible one, namely a "mixed" view, proposed by Zamparelli (2002). In English, bare plurals and mass nouns may act like singular indefinites, receiving an existential interpretation. However, all English bare plurals and mass nouns may also refer to kinds, and on that interpretation may display the various different readings, including the existential interpretation. In fact, Italian and French plural and mass definite NPs act as kind terms, displaying those very same readings with suitable predicates, as Zamparelli shows.

The third view, that is, the view that (apparent) kind reference goes along with the four different readings, is plausible also in view of the fact that the various readings are all available even with kind terms that are not bare NPs. First, as Carlson had himself observed, the readings in question are available with explicit kind-denoting NPs of the sort *this kind of* N, where N is a bare plural or mass noun:

(15) a. John found this kind of fruit.
b. This kind of animal is striped.
c. John needs this kind of metal.
d. This kind of animal exists.

(15a) contains an episodic predicate, (15b) a characterizing predicate; (15c) an intensional predicate, and (15d) an existential predicate, all leading to the same readings as they did with bare mass nouns and plurals.[4]

Second, kind term behavior is displayed also by quantifiers like *something*, which I call *special quantifiers*. Special quantifiers are "special" in that they can replace a variety of expressions that do not act as ordinary referential expressions, while at the same time preserving the acceptability or the same reading of the predicate. Special quantifiers in English include the quantifiers *something, everything, nothing, several things*, and *the thing*. They are formed with the morpheme *thing,* which with some determiners (*some, every, no*) acts as a bound morpheme; with others (*several, many, the*) as an independent morpheme. The paradigm of "special quantifiers" also includes the demonstrative *that* and the free relative pronoun *what*. Special quantifiers are highly interesting philosophically, in particular with respect to the role abstract objects play in natural language. Their semantic connection to kind terms is only one of many ways in which they bear on the issue of abstract objects.

[4] There is an alternative analysis of the construction *this kind of fruit*, though, on which it does not stand for a kind (Wilkinson 1995, Zamparelli 1998). On that analysis, *this kind of* acts semantically as a modifier of *fruit* to the effect that the NP *this kind of fruit* will be synonymous with *a fruit of this kind*. Whatever the right analysis of the construction, there are other cases discussed below that support the present argument.

The valid inferences below show that special quantifiers can replace bare mass nouns and plurals, while preserving the acceptability as well as the relevant reading of the predicate:

(16) John found gold/diamonds.
John found something.

(17) a. Gold is shiny.
Something is shiny.
b. Diamonds are precious.
Something is precious.

(18) John needs gold/diamonds.
John needs something.

(19) a. Gold is rare.
Something is rare.
b. Diamonds are rare.
Something is rare.

Other NPs that are not bare plurals or mass nouns and display kind term behavior are definite NPs like *the belief that* S or *the desire to* VP, which I will turn to shortly.

The observation that various kinds of NPs display kind term behavior, including bare plurals and mass nouns in English, but also certain definite NPs and singular quantifiers, is an important one. Given the variety of NPs that display kind term behavior, it is clear that the syntactic category cannot be responsible for triggering the readings of the predicates in question.[5] Furthermore, the possibility of co-predication with predicates that trigger different readings of NPs displaying kind term behavior means that the different readings cannot be traced to different interpretations of the NPs themselves, but must be traced to the particular contribution of the predicates.

3. Kind terms and kind-referring terms

3.1. Kinds as objects of reference

As I will argue later, kind terms (that is, bare mass nouns and plurals as well as the other kinds of NPs that display kind term behavior) are not singular terms referring to abstract objects that are "kinds." Rather they plurally refer to the various instances (including possible instances) of the kind. They thus contrast with terms that do refer to kinds as single objects. One such kind-referring term in English consists in definite NPs such as *the Coca Cola bottle* or *the Siberian tiger*; another somewhat marginal type

[5] Thus, in particular it should not be traced to a kind variable at logical form translating NPs of a particular syntactic category (as, for example, in Chierchia 1998).

consists in explicit kind-referring terms such as *the metal gold* or *the kind human being*. Thus, "kind terms" need to be distinguished from "kind-referring terms."

A number of differences between kind-referring definite singular NPs on the one hand and bare plurals and mass nouns on the other hand have been observed in the linguistic literature (cf. Krifka et al. 1995). One such difference consists in that bare plurals and mass nouns can be formed from almost any nominal, whereas kind-referring definite singular NPs are limited to nominals that describe well-established kinds. For example, whereas *green bottles* has a generic interpretation, *the green bottle* (as opposed to *the Coca Cola bottle*) lacks such an interpretation. Moreover, the two kinds of terms trigger different readings with the five classes of predicates. Kind-referring, definite singular NPs do not allow for existential quantification with episodic predicates, as seen in (20a), and they trigger a different reading of intensional predicates, as seen in (20b):

(20) a. John found the lion.
b. John is looking for the lion.

(20a) and (20b) have only implausible readings on which John found or was looking for the kind as a whole. Only characterizing predicates as in (21) allow for a generic interpretation of *the lion*:

(21) a. The lion has a mane.
b. The lion lives in Africa.

Obviously, in (21a, b) it is not the kind as such that is said to have a mane or to live in Africa, but the individual instances. However, kind-referring terms differ from bare plurals and mass nouns even with characterizing predicates. Kind-referring, definite singular NPs accept only certain characterizing predicates, namely only those that are characteristic or stereotypical of the kind, not any predicates that may hold of all or most instances. For example, *breathes* in (22a) is not good, though it is fine with bare plurals and mass nouns, and a disjunctive predicate as in (22b) is impossible (unless *or* is understood as taking wide scope):

(22) a. ?? The lion breathes regularly.
b. ??? The lion is male or female.

Generic definite singular NPs refer to kinds of a sort that may inherit their properties at best from typical or stereotypical exemplars, but not from the instances in general.

Explicit kind-referring terms such as *the kind gold* behave like kind-referring singular definite NPs in that they fail to trigger the relevant readings with episodic and intensional predicates:

(23) a. John bought ?? the metal gold/ok gold.
b. John is looking for ?? the metal gold/ok gold.

Like kind-referring singular definite NPs, explicit kind-referring terms differ from kind terms also in that they are subject to greater restrictions on characterizing predicates:

(24) a. Human beings are prone to disease/are intelligent/are selfish.
b. ?? The kind human being is prone to disease/is intelligent/is selfish.

Moreover, they do not allow for disjunctive predicates, unless the disjunction takes wide scope. Thus, whereas (25a) allows human beings to be male or female, (25b) implies that the entire kind is either male or female:

(25) a. Human beings are male or female.
b. ?? The kind human being is male or female.

To summarize, terms that clearly refer to kinds as entities, such as generic definite singular NPs and explicit kind-referring terms, do not share the particular kind term behavior that is characteristic of bare plurals and mass nouns.

3.2. Properties and kinds of tropes

Kind terms and in particular bare adjective nominalizations exhibit a very similar contrast with respect to explicit property-referring terms such as *the property of being wise*. Explicit property-referring terms obviously belong to a rather technical part of English. Yet they are perfectly well formed and as such give rise to clear intuitions—and not just among speakers used to using such terms. Explicit property-referring terms also include somewhat more "natural" terms such as *the virtue of humility* or *the attribute of shyness*. Bare adjective nominalizations, moreover, contrast also with simpler terms, when used to refer to what explicit property-referring terms refer to, for example, *that property* or even *that entity* or *that thing*. Therefore, the relevant contrast is a more general one between bare mass nouns and plurals on the one hand and property-referring terms of whatever sort on the other hand (rather than terms of a philosophical vocabulary with a rather limited use).[6]

Five kinds of predicates can be distinguished that display different readings or degrees of acceptability with property-referring terms and with bare nominalizations. This is illustrated with a range of examples below:

[1] Episodic predicates

(26) a. John has encountered hostility.
b. John has encountered the property of being hostile.

[6] A discussion of intuitions associated with terms like *the property of being honest* and *the property of honesty* can also be found in Wolterstorff (1970), Chapter 3. Wolterstorff assumes that *honesty* and *the property of honesty*, as well as *the property of being honest*, are synonymous. However, he notices differences between state names like *being honest* and *the property of being honest* (John can possess the latter, but not the former), which he attributes to the *use* of the two kinds of terms, rather than the entities themselves that they denote.

(27) a. Generosity rarely is reciprocated.
b. The property of being generous rarely is reciprocated.

Whereas (26a) is true if John has encountered an instance of hostility, (26b) could not possibly be true at all—or rather, more accurately, it could only be true in a metaphysical fantasy, let's say a fantasy about Plato's heaven where John has encountered the abstract object that is the property of being hostile. The same kind of contrast holds for (27), except that it is hard to think even of circumstances of fantasy in which (27b) could be true.

[2] Predicates of evaluation

(28) a. Friendliness is nice.
b. The property of being friendly is nice.

(29) a. Ordinariness is boring.
b. The property of being ordinary is boring.

Whereas the application of *nice* to "friendliness" in (28a) must be based on the evaluation of instances of friendliness being nice (friendly people, gestures, behavior), *nice* in (28b) evaluates an abstract object (which may be "nice" in having nice formal properties). *Nice* in (28b) could not possibly be understood as evaluating the instances. The same holds for (29). *Boring* in (29a) evaluates instances, whereas in (29b) it evaluates an abstract object.

[3] Intensional predicates

(30) a. John is looking for honesty.
b. John is looking for the property of being honest.

(31) a. John needs efficiency.
b. John needs the property of being efficient.

Whereas John's search according to (30a) is satisfied if John finds an instance of honesty, the satisfaction of his search according to (30b) requires him to find the abstract object. (30a) displays only an intensional reading, but (30b) naturally has an existential reading, presupposing the existence of the abstract object. A similar contrast holds for (31).

[4] Existence predicates

(32) a. Generosity exists.
b. The property of being generous exists.

(32a) is true just in case there is an instance of generosity. By contrast, (32b) is true just in case the abstract object as such exists, regardless of its instantiations.

In all these examples, normally the reading of the a-example is not available for the b-example, and vice versa. There is a way, though, also to understand the b-examples

like the a-examples, and that is when the topic of conversation was already about the property in question or about properties in general. For example, when the conversation was about what properties one should study for a particular project, then an utterance of (29a) can in fact be understood just like (29b).

[5] Instance-distribution predicates

(33) a. Honesty is rare.
b. Sloppiness is widespread.

(34) a. ?? The property of being honest is rare.
b. ?? The property of being sloppy is widespread.

Instance-distribution predicates do not display different readings with the two kinds of terms. However, they display different degrees of acceptability. Instance-distribution predicates are perfectly acceptable with bare adjective nominalizations as in (33), but not with explicit property-referring terms as in (34), which at least many speakers dislike.

Less technical property-referring terms, such as *the attribute of honesty, that property, that entity*, or *that thing* behave with the five classes of predicates just like explicit property-referring terms:

(35) a. John never encountered the attribute of honesty/that property/that entity/that thing.
b. The attribute of honesty/that property/that entity/that thing is interesting.
c. John needs the attribute of honesty/that property/that entity/that thing.
d. The attribute of honesty exists.
e. The attribute of honesty/that property/that entity/that thing is widespread.

(35a) fails to display an existential reading involving instances, (35b) and (35c) only allow for a reading on which an abstract property object is evaluated, and (35d) states the existence of an abstract object independently of whether it is instantiated. (35e) with an instance-distribution predicate is not that good, just as in the case of explicit property-referring terms.

Besides bare nominalizations, there are also certain types of definite NPs that trigger the relevant readings of the five classes of predicates. One of them is of the form *this kind of* N'. Its readings with predicates from the five classes are illustrated below:

(36) a. John never encountered this kind of behavior.
b. This kind of behavior is interesting.
c. John does not need this kind of behavior.
d. This kind of animal no longer exists.
e. This kind of behavior is rare.

Another type consists in NPs that formally match explicit property-referring terms, but contain certain other head nouns than *property* or *attribute*. For example, NPs with *quality* or *character trait* as head nouns display kind term behavior:

(37) a. John never encountered the character trait of shyness/the quality of honesty.
b. John likes the character trait of shyness/the quality of honesty.

(37a) and (37b) display readings quantifying over concrete instances, rather than involving reference to an abstract object that is a character trait or a quality.

Finally, special quantifiers like *something* display kind term behavior. When they replace a bare adjective nominalization, the same readings of the various sorts of predicates are preserved:

(38) a. John encountered the same thing as Mary, namely hostility.
b. Courage is something that is admirable.
c. John needs something, namely courage.
d. True courage is something that is rare.

Special quantifiers like *something* and *the same thing* thus differ fundamentally from terms like *that entity, that thing*, and *that property*, which do not trigger the readings of predicates typical of kind terms.

Bare nominalizations as well as certain definite NPs thus differ from explicit property-referring terms in that they display kind term behavior. With explicit property-referring terms, predicates apply just as they do when they apply to ordinary individuals. By contrast, predicates apply to what bare adjective nominalizations stand for by applying to the instances in one way or another, imposing quantificational conditions regarding possibly different circumstances.

3.3. Tropes and kinds of tropes

Bare adjective nominalizations exhibit the same kind term behavior as underived bare mass nouns and plurals. Thus, they should stand for kinds in some sense. However, what sorts of kinds would these be, that is, what are the instances of universals like "honesty" or "beauty"? In tune both with a long philosophical tradition and with linguistic intuitions, I take the instances of such universals not to be individuals or quantities, but rather particularized properties or what philosophers now commonly call *tropes*. Tropes are concrete instantiations of properties. Thus, the particular hostility of John's gesture is an instance of "honesty" and the particular beauty that Mary manifests an instance of "beauty." They are in fact just the kinds of things that adjective nominalizations with definite NPs in complement or specifier position stand for, for example *the honesty of John's gesture* or *Mary's beauty*.[7]

[7] The view that terms like *the wisdom of Socrates* stand for tropes can be also found in Strawson (1953–4) and in Wolterstorff (1960, 1970, Chapter 6). Wolterstorff recognizes that there is another reading of such terms on which they stand for sub-kinds, as in *John has the wisdom of Socrates and the strength of Goliath*.

That tropes are the instances of at least certain universals is a view that goes back as far as Aristotle and the middle ages. Thus, Aristotelian "accidents" or the "modes" of medieval philosophy correspond, more or less, to tropes as discussed in contemporary metaphysics. Accidents in Aristotelian metaphysics formed a category of particulars besides individuals and were considered (at least within the subsequent Aristotelian tradition) the instances of "qualities" (whereas individuals, primary substances, were considered the instances of another category of universals, namely "secondary substances"). Tropes are considered the instances of a category of qualities also by Neo-Aristotelians such as Lowe (1998). Sometimes also a distinction between "adjectival universals" and "substantival universals" has been made. Tropes are considered instances of the former and individuals of the latter.

Contemporary trope theory generally takes tropes to be the instances of all universals, and a number of philosophers have pursued the idea of construing universals in terms of tropes, in particular as sets of resembling tropes. Moreover, attempts have been made to also construe individuals in terms of tropes, namely as bundles of co-located tropes (cf. Stout 1952, Williams 1953, Campbell 1990, Simons 1994). In this book, I will make use of tropes simply as the sorts of entities that terms like *John's honesty* refer to and that naturally act as instances of universals like "honesty." No commitment whatsoever is made to a view on which universals in general or even individuals are reducible to tropes.

Why should entities like "the honesty of John" or "the beauty of Mary" be considered tropes, rather than, let us say, states or events, which are categories more familiar in linguistic semantics? I will address this question in detail in Chapter 2. Here I will restrict myself to just two remarks. First, tropes differ from states in that they are concrete (as long as their bearer is concrete), whereas states in general are abstract—in a certain sense of "abstract." Tropes differ from events in that they do not constitute a change from one property to another, but rather involve the concrete manifestation of a single property.

The various readings that the four classes of predicates display with bare adjective nominalizations involve tropes as instances in just the way that underived bare plurals and mass nouns involve individuals or quantities as instances. For example, (26a) displays existential quantification over things like the hostility of particular acts or attitudes, and (28a) displays universal quantification over things like the friendliness of Mary or the friendliness of a gesture.

3.4. Other kind terms

Other NPs classify as kind terms by exhibiting kind term behavior with the four classes of predicates. However, they do not stand for kinds of tropes. For example, there are bare mass nouns standing for kinds of events, such as *laughter* or *rain*. Moreover, gerunds such as *being happy* act as terms for kinds of states.

There is a particularly interesting type of definite singular definite NP that displays kind term behavior. It involves a deverbal nominalization and a clausal complement.

Examples are *the belief that* S, *the thought that* S, *the hope that* S, and *the request that* S. In Chapter 4, I will argue that *the belief that* S is a term for a kind whose instances are what I call *attitudinal objects,* objects of the sort "John's belief that S" or "Mary's belief that S." As will be elaborated in Chapter 4, attitudinal objects are neither propositions nor mental events or states, but rather something in between. Unlike propositions, attitudinal objects depend on a particular agent and a particular mental event or state. Unlike mental events or states, attitudinal objects have truth conditions or more generally satisfaction conditions. The kind term behavior of *the belief that* S is shown below:

(39) a. John never encountered the belief that the devil exists.
b. The belief that the devil exists is unfounded.
c. John lacks the belief that the devil exists.
d. The belief that the devil exists is widespread.

(39a) involves existential quantification over particular beliefs, (39b) generic quantification, and (39c) existential quantification relative to counterfactual situations. (39d), with an instance-distribution predicate, is perfectly acceptable.

Also NPs like *the desire to become rich* display kind term behavior. They stand for kinds whose instances are entities such as "John's desire to become rich." The kind term behavior of *the desire to become rich* with the four classes of predicates is shown below:

(40) a. John never developed the desire to become rich.
b. The desire to become rich is not innate.
c. John lacks the desire to become rich.
d. The desire to become rich is widespread.

NPs such as *the belief that* S or *the desire to become rich* show (again) that kind term behavior is not tied to the particular syntactic form of a bare NP. It is compatible with the presence of a definite determiner and a singular count noun as head noun (*belief, desire*).

4. Terms for instances and terms for universals

Terms for tropes generally are formed with an adjective nominalization and an NP in specifier or complement position (*Mary's beauty, the beauty of Mary*). An NP so formed in fact *must* refer to a trope and cannot refer to a more specific universal. Thus, the sentences below do not make sense because *the beauty of Mary* and *the wisdom of Socrates* cannot refer to a kind of trope (a particular kind of beauty or kind of wisdom):[8]

[8] There are apparent exceptions to this generalization, discussed in Wolterstorff (1970), namely cases like the ones below:

(i) a. John has the wisdom of Socrates.
b. Sue does not have the beauty of Mary.

(41) a. John never encountered the beauty of Mary.
b. The wisdom of Socrates is rare.

However, reference to a more specific universal is possible when a demonstrative determiner such as *this* precedes the adjective nominalization and there is no complement:

(42) a. John never encountered this anger.
b. John has never experienced this nervousness.
c. Mary does not need this impatience.

The demonstrative determiner in these NPs serves to establish reference not to a particular trope that the speaker "points at," but rather to a kind of which the trope the speaker points at is an instance. In other words, *this anger* and *this nervousness* are "type demonstratives."[9]

There are also trope-referring terms such as *the shape of the car* or *the color of the apple* with nouns not derived from adjectives. They likewise cannot be used to refer to the more specific universal:

(43) a. ?? John never saw the shape of this object.
b. ?? John never saw the color of that flower.

Again, the same nouns with a demonstrative determiner and without a complement will yield terms referring to universals, that is, type demonstratives:

(44) a. John never saw this shape.
b. John never saw this color.

These observations justify the following generalization. Trope-describing nouns come in two variants: a relational variant and a non-relational variant. The relational variant expresses a relation between particular tropes and their bearers, whereas the non-relational variant expresses a property of kinds of tropes.

The ability of nouns to describe a kind appears tied to the fact that there is a relational variant of the noun describing particulars. This itself is revealing as to the way reference to a kind is achieved, namely on the basis of possible instances (instances in the extension of the relational noun) and not on the basis of the inherent content of the noun itself. In fact, it is indicative of the nature of universals that are "kinds," namely as pluralities of (possible) instances, or so I will argue.

In metaphysics, a common view of universals is that they are classes of particulars. In particular, "adjectival universals" would be classes of resembling tropes (Williams 1953, Campbell 1990, Simons 1994, Bacon 1995). For example, "honesty" would be the class of "honesty tropes." One problem for this view is that it does not get the modal properties of the denotation of *honesty* right. "Honesty" might have more, less,

[9] See Levine (2010) for the notion of a type demonstrative.

or different instantiations than it actually has (Loux 1998). To account for their modal properties, "adjectival universals" should better be construed as functions from worlds and times to sets of tropes. Based on the relational use of a noun like *honesty*, such a function is given below:

(45) $\text{int}(\textit{honesty}) = \lambda i\, \lambda d\, [\exists d'\ \text{honesty}_i(d, d')]$

Yet such a function should not be considered identical to a kind, that is, the referent of a kind term. This is because it could not possibly explain the particular readings that kind terms have with different sorts of predicates. Yet it will be useful to associate kind terms with such a function, namely as the intension of a kind term.

5. Kind reference

5.1. Making sense of kind reference

Let us consider the view (which I will then reject) that kind terms (bare plurals and mass nouns and other terms displaying kind term behavior) refer to abstract entities that are kinds. This view has to trace the kind term behavior to the particular sort of object those terms would refer to. That is, the readings of the different sorts of predicates that kind terms trigger would have to be explained on the basis of the ontology of the objects that kind terms refer to.

The required objects of reference would have to be special in that they could not bear the properties normally expressed by predicates of natural language, except for instance-distribution predicates. Instead, the objects would require extended meanings of predicates, meanings that involve quantification over instances and attribution of the property that is the ordinary meaning of the predicate of the instances. Kinds as objects of reference of kind terms would in that respect differ from kind-referring terms like *the Siberian tiger* or *the kind water* as well as explicit property-referring terms like *the property of being* P.

The view would thus have to draw a fundamental distinction between two kinds of entities: entities that are potential bearers of properties ordinarily expressed by predicates (ordinary objects, property objects, and kinds that are objects) and entities that are not (kinds that are the referents of kind terms). Certain expressions (ordinary NPs), on that view, would be suited to refer to entities that are property bearers in that sense. Other expressions (kind terms and special quantifiers) could only take kinds as semantic values that are not bearers of properties in that sense.

What then is the formal semantics of predicates when they apply in a derivative way to kinds? If kind terms stand for objects that are kinds, these would be objects to which a predicate can apply only with an extended meaning, that is, a meaning obtained in one of a limited number of ways from the ordinary meaning. For example, a kind would be attributed the predicate *was encountered by John* by attributing *was encountered by John* with its ordinary meaning to an instance of the kind, and a kind would be

attributed the extended meaning of *is nice* by attributing *is nice* with its ordinary meaning to (more or less) all its instances.

Central on this account would be a distinction between ordinary and extended meanings of predicates. If kinds are objects that resist properties, they still would not resist the derived properties expressed by predicates in their application to kinds. Such derived properties cannot be defined independently of natural language predicates; they are to be understood as properties strictly defined on the basis of the basic lexical meaning of natural language predicates (by a limited number of operations such as existential and generic quantification over instances, as well as the particular operations needed for intensional predicates). Kinds as objects of reference would be special in that they cannot bear the properties expressed by natural language predicates, except in a derived way (with the exception of instance-distribution predicates).

Formally, the extended meaning of an episodic predicate will be as in (46a) and the extended meaning of a characterizing predicate as in (46b), where 'k' is a variable for kinds, 'I' the symbol for the instantiation relation (relativized to a circumstance, for example a time-world pair), and 'Gn' the generic quantifier (as in Krifka et al. 1995):

(46) a. For an episodic predicate *P*,
$[P_{ext}] = \lambda i\, \lambda k[\exists d'(d'\ I_i\ k\ \&\ P_i(d'))]$.
b. For a characterizing predicate *P*,
$[P_{ext}] = \lambda i\, \lambda k[Gn\ d'[d'\ I_i\ k]\ P_i(d')]$.

Here and throughout this book, "[]" symbolizes the translation function translating expressions of English into the relevant formal language.

The extended meaning of the transitive intensional verb *need* can be given as in (47c), making (47a) equivalent to (47b):

(47) a. John needs water.
b. John needs some water.
c. $[need_{ext}] = \lambda i\, \lambda dk[\forall s(s \vDash \text{d's need} \rightarrow \exists d'(d'\ I_s\ k\ \&\ R_s(d, d')))]$

Here I make use of the analysis in Moltmann (1997) (see also Chapter 5): *John needs some water* is true just in case for any situation *s* exactly satisfying John's needs, for some water *d*' a suitable relation *R* (let's say "having") holds between John and *d*' in *s*.

The predicate *exist* would have an extended meaning analogous to that of an episodic predicate:

(48) $[exist_{ext}] = \lambda i\, \lambda k[\exists d'(d'\ I_i\ k\ \&\ exist_i(d'))]$

In fact, *exist* can itself be considered a particular case of an episodic predicate.[10]

Instance-distribution predicates do not have an extended meaning applying to a kind in virtue of its underived meaning applying to instances of the kind. However,

[10] For the view that *exist* is in fact an extensional first-order predicate see Salmon (1987) and McGinn (2000).

instance-distribution predicates can be analyzed as quantifiers ranging over the instances. For example, *rare* can be analyzed as a binary quantifier ranging over entities and places. Then (49a) has the analysis in (49b), where "AT" is the relation of "being spatially at":

(49) a. Honesty is rare.
b. RARE p d ∃d'(honesty(d, d') & AT(d, p))

That is, (49a) is analyzed as "there are few places *p* and instances *d* of honesty (of someone *d*') such that *d* is at *p*." Instance-distribution predicates then would not have extended meanings when applying to kinds, but meanings defined in terms of quantification over instances, as below:

(49) c. [*rare*] = λi λk[RARE p d (d I_i k & AT_i(d, p))]

What would be the semantic status of predicate extensions as in (46a, b), (47c), and (48)? The predicate extensions could correspond to distinct (homonymous) predicates or constitute additional predicate meanings or disjuncts of a wider, disjunctive lexical meaning of the same predicate. Only the latter option appears adequate. That is because a question such as (50) with a single occurrence of a verb can be answered either by (51a) (mentioning an object) or (51b) (mentioning a kind):

(50) What did John buy/like/look for?

(51) a. Apples.
b. My painting.

The occurrence of *buy, like,* and *look for* in (50) should thus include both the object-oriented and the kind-oriented meaning. Predicates will then generally have a disjunction as their meaning, consisting of their basic meaning as one disjunct and a suitably derived property for kinds as the other disjunct.

The predicate-extension account of kind predicates has its limits, for example, when it comes to predicates expressing mental evaluations or preferences:[11]

(52) a. John likes honesty.
b. John prefers honesty to charm.

(52a) certainly does not mean that John likes all instances or all typical instances of honesty. Yet it also does not mean that John likes the abstract object that is the property of being honest. John's mental state of liking is directed toward concrete instances of honesty, for example, instances that caused John's attitude of liking or possible instances that John conceives of when making hypothetical judgments. Similarly, (52b) certainly does not require that John prefers any instance of honesty to any instance of charm.

[11] Examples like these are generally mentioned as problems for a reduction of statements about universals to statements about particulars. See the discussion in Jackson (1977) and Devitt (1980).

Rather his preference may involve comparisons of concrete instances of honesty and of charm in hypothetical circumstances of some sort. Thus, even here the assignment of properties to kinds is based on the assignment of properties to actual or hypothetical instances, but in a way not straightforwardly analyzable in terms of quantification over instances. The involvement of instances rather appears to be part of a possibly not fully analyzable lexical meaning of a predicate.

5.2. The problems with reference to kinds

The view that kind terms refer to objects that are kinds faces some serious difficulties. The difficulties derive from the inability of the required kind objects to bear the properties that are the ordinary meanings of natural language predicates. Kinds in the required sense would not be ordinary objects, but "non-objects," as I called them in Moltmann (2004b, c), that is, entities unable to bear properties (of a certain non-derivative sort). As "non-objects," kinds would have an entirely secondary status, a status reflected in the fact that they are not needed in the truth conditions of sentences that contain terms referring to them. That is because predicates apply to kinds only with derivative meanings analyzable in terms of properties of, relations among, or quantification over instances of the kind. Sentences involving reference to kinds in the relevant sense are thus straightforwardly equivalent to sentences only involving reference to particulars.

The notion of an entity unable to bear properties as expressed by natural language predicates is highly problematic. First, such a notion does not conform to our general understanding of kinds—or any other sort of entity for that matter. If kinds are objects of reference of bare plurals and mass nouns, why can't predicates like *describe, count*, or *look for* display a reading on which the predicate, with its ordinary, underived meaning, applies to the kind itself, rather than to some instances? For example, the predicates in the sentences below could have readings on which they apply to the kind as a whole—readings that may not be plausible, yet are perfectly conceivable:

(53) a. John wants to buy white gold. (He wants to buy the kind.)
b. John counted pink diamonds. (He counted one—the kind.)
c. John is looking for pink diamonds. (He is looking for the kind.)

(53a) could not possibly mean that John (being slightly deluded) wants to buy the kind; (53b) cannot mean that John counted "one," by counting just the kind; and (53c) cannot mean that John is looking for one thing, namely the kind. It is impossible to read (53a, b, c) in such a way that the predicates would apply to a single object that is a kind. Rather, with kind terms, predicates must have instance-related readings.

The view of kinds as entities resisting (non-derivative) properties is problematic also in view of the very general fact that any entity must be able to bear at least "formal

properties" such as being a kind, being an entity, or being unable to bear properties expressed by natural language predicates.

Another problem for the view is a problem of substitution. If kinds are objects, then it should be possible to refer to them with ordinary singular NPs, such as *that kind, that entity*, or *that object*. However, none of those NPs exhibit kind term behavior:

(54) a. John found that kind, white gold.
b. John is looking for that object, white gold.
c. That entity, white gold, is expensive.

The predicates in (54) do not display the instance-related readings that they have with kind terms.

The kinds that kind terms on the view in question refer to would also have to be exempt from the domain of ordinary quantifiers. That is, they could not be part of the domain of quantifiers such as *every kind, every entity, every object*, or *every thing*. Kinds as "non-objects" would be included only in the domain of special quantifiers such as *something* or *everything*, not in the domain of ordinary quantifiers.

The view thus is forced to consider kinds as entities that escape ordinary predication, referential access with a full NP, as well as quantification with ordinary quantificational NPs. The very same expressions, however, can be used in the metalanguage to talk about kinds, and the very same metalanguage terms may be part of the object language too.

The view of kinds as non-objects is problematic also from the point of view of lexical semantics. In general, if an argument is not of the right type required by a predicate or the relevant reading of the predicate, coercion is possible, that is, type shift mapping the argument to a related object that will meet the categorical requirements of the predicate (or the relevant reading of the predicate). Thus, coercion, so the common view, can render (55a) acceptable—type shifting an object to an event—to get an interpretation of (55a) as in (55b):

(55) a. Mary started the bread.
b. Mary started eating the bread.

By contrast, coercion could not possibly influence the applicability of predicates or readings of predicates with kind-referring terms as in (54a–c). For (54a–c) coercion is simply not an option, that is, type shift of a kind as an object to a kind as a "non-objects." The sentences have only the one implausible reading.

We can thus conclude that an ontological account of kinds as property-resistant entities fails both for philosophical and for linguistic reasons.

There is a non-ontological variant of the account that may appear less problematic. I will call it the *intensional account* of kind terms. On the intensional account, predicates with kind terms retain the same meaning they have when applying to instances of the kind. However, the kind term will play a different semantic role. It will not denote

an entity, but has as its sole function to direct the application of the predicate to particular instances. For example, episodic predicates will apply to kinds as in (56a) and characterizing predicates as in (56b), where 'Int' stands for the function that maps a kind onto the property that holds just of the instances of the kind at a given circumstance:

(56) a. For an episodic predicate *P* and a kind term *k*,
$[P\ k] = \lambda i[\exists d'(Int(k)_i(d) \ \& \ P_i(d'))]$.

b. For a characterizing predicate *P* and a kind term *k*,
$[P\ k] = \lambda i[Gn\ d' Int(k)_i(d')]\ P_i(d')]$.

That is, an episodic predicate with a kind term *k* gives truth in a circumstance *i* just in case the predicate with its ordinary meaning holds of some entity in the extension of *k* in *i*. Furthermore, a characterizing predicate with a kind term *k* gives truth in a circumstance *i* just in case the predicate with its ordinary meaning holds of (roughly) all normal entities in the extension of *k* at *i*.

On this account, a predicate with a kind term has a derivative meaning in the sense that the predicate applies to the kind by applying its familiar meaning to the instances in the extension of the kind at a circumstance. The five classes of predicates on that account are all treated as intensional verbs, requiring an intensional interpretation in the presence of a kind term.

This account avoids positing "non-objects" with all the problems associated with them. Moreover, the account does not predict coercion being available. On the intensional account, episodic, characterizing, and intensional verbs come in two variants: an extensional and an intensional variant. However, a kind term, denoting an intension, will require the intensional variant of the predicate and a kind-referring term will require the extensional variant. Type-shift cannot apply to objects mapping them onto intensions and vice versa.

The intensional account of kind terms, however, suffers from a serious linguistic inadequacy. The instance-related interpretations that kind terms would trigger are (with the exception of intensional predicates) simply not the readings typical of intensional verbs in general. The account would make all predicates applying to kinds intensional, but this is just wrong: the intensional interpretation should be available only for one class of predicates, the transitive intensional ones. Note also that the intensional interpretations are triggered in a highly unusual way, by a class of terms (kind terms) that includes a variety of formally different kinds of NPs (bare mass nouns and plurals, but also certain definite NPs, as well as special quantifiers). This is a highly unusual formal condition for triggering a special interpretation of the predicate. The intensional account of kind terms thus appears rather untenable for linguistic reasons.

6. A plural-reference account of kind terms

Given the problems for the ontological and the intensional account of kind terms, I will propose a third account, an account that assimilates kind terms to plurals, on a certain view of the semantics of plurals. Kind terms on that view are plural terms standing for the plurality of all the instances of the kind in question. As further support for the view, I will show that certain generalizations about plural predicates apply to kind predicates as well.

A first piece of support for the plural-reference account of kind terms is that kind terms that are bare plurals are acceptable with predicates that generally are restricted to plural arguments, such as *count, distinguish, enumerate*, and *be numerous*:

(57) a. John counted sheep.
b. John is unable to distinguish sheep from each other.
c. John was enumerating mistakes all day long.
d. Insects are numerous.

If kind terms are plural terms, the applicability of plural predicates is unsurprising. Of course, such predicates take into account only pluralities of actual individuals, not pluralities of all the instances of a kind.

There are two fundamentally different approaches to the semantics of plurals, in particular definite plural NPs: first, what I will call the *reference-to-a-plurality approach* and second, what I will call the *plural-reference approach*. The first approach takes plurals to refer to single entities, pluralities, of some sort; the second approach takes plurals to refer to several individuals at once. On the first approach, *the children* stands for a collective entity, a group, or plurality of children; on the second approach, it refers to every relevant child at once.

The view that kind terms refer to kinds as single objects corresponds to the reference-to-a-plurality approach to definite plurals, and in fact the two approaches to kind terms and to plurals give rise to parallel problems. Those problems are avoided by a plural-reference account of plurals and what I will call the *modalized plural-reference account* of kind terms. On the modalized plural-reference account of kind terms, a bare plural like *children* refers to the various children in the various possible situations at once. Similarly, *water* will refer to the various possible water quantities at once, and *wisdom* will refer to the various possible tropes of wisdom at once. Let me first discuss the two approaches to plurals before turning to the modalized plural-reference account of kind terms.

6.1. The semantics of definite plurals: reference to a plurality or plural reference?

The reference-to-a-plurality approach is the most common way in linguistic semantics of analyzing definite plurals (Link 1984, Schwarzschild 1996, Moltmann 1997a). On that approach, definite and conjunctive plural NPs are taken to refer to single entities that are "pluralities" of some sort, that is, collective entities conceived of as sums, sets,

or collections in some other sense. Thus, just as the definite singular *the child* stands for the only child in the context, the definite plural *the children* stands for an entity that is a plurality of children, namely the maximal plurality of children in the context. Let us take "sum" to be a suitable functor mapping a set of entities (the extension of a plural noun in a context *c*) to the entity that is the plurality (in some sense) consisting of the members of that set. The semantics of definite plurals will then be as follows, where "c" is a variable ranging over contexts:

(58) [*the children*] = $\lambda c\ \lambda i\ \lambda y[y = \text{sum}(\lambda x[\text{children}_{c,i}(x)])]$

With many predicates, the use of a plural NP as in (59a), as opposed to a collective NP as in (59b), does not seem to make a difference:

(59) a. The children are asleep.
b. The group of children is asleep.

Plural and collective NPs, however, behave differently with a range of predicates or readings of predicates. These differences are strikingly similar to the ways bare nominalizations and explicit property-referring terms differ from one another. In particular, there are three classes of predicates or readings of predicates with which plurals and collective NPs behave differently:

[1] Distributive readings of predicates

Generally, only definite plurals, not definite collective NPs, allow for a distributive interpretation of the predicate (given, of course, that the predicates would allow both a collective and a distributive interpretation) (cf. Moltmann 1997):

(59) a. The things are heavy.
b. The collection of things is heavy.

(61) a. The team members lifted the piano.
b. The team lifted the piano.

(60a) and (61a) allow for both a collective and a distributive interpretation, whereas (60b) and (61b) allow for only a collective interpretation.

[2] Predicates making reference to members of the plurality, but not to the plurality as a whole

Collective predicates whose content involves reference to the members of a plural argument, but not to the plural argument as a whole, allow only for plural NPs, not collective NPs as complements (cf. Moltmann 1997).[12] The predicates in question

[12] Predicates not only making reference to the group members, but also to the group as a whole (for example the organization or spatial configuration of the group) allow for plural as well as collective NPs (cf. Moltmann 1997):

include *compare, distinguish, like each other*, and *similar* (for the relevant argument position). The content of those predicates obviously involves binary relations among the members of the plurality, but not a property holding only of the plurality as a whole. The relevant class of predicates also includes *count* and *numerous*, predicates whose content is based on a function applying to the members of the plurality:

(62) a. John compared the students.
b. ??? John compared the class.

(63) a. The students like each other.
b. ??? The class likes each other.

(64) a. John cannot distinguish the students.
b. ??? John cannot distinguish the class.

(65) a. The students are similar.
b. ??? The class is similar.

(66) a. John counted the students.
b. ??? John counted the group of students (except if it means that John counted "one").

(67) a. The students are numerous.
b. ??? The class is numerous.

[3] Predicates of existence

With definite plurals, the verb *exist* can claim only the existence of members of the plurality, not the existence of the plurality as an entity "beyond" its members. By contrast, when *exist* occurs with collective NPs, it can claim the existence of a collective entity as such:

(68) a. The students do not exist.
b. The class does not exist.

(68a) denies the existence of the individual students; (68b) denies the existence of the class, as an entity beyond the individual students.

A class is an entity that has essential integrity; and it is the existence of an entity constituted that way that is denied in (68b). However, the contrast also holds with

(i) a. The class dispersed.
b. The students dispersed.

(ii) a. John organized the collection of things on his desk.
b. John organized the things on his desk.

The reason these predicates are acceptable with collective NPs is presumably that their content is not reducible in the same way to properties of group members, but rather involves a configurational property of the group as a whole. That is, such predicates will count as expressing basic, not derived, properties.

collective NPs that do not imply the essential integrity of their referent, such as (69a) and (69b), though the relevant examples have a more technical character:

(69) a. The collection of the students (as such) does not exist.
b. The sum of the students does not exist.

The sentences in (69) have to be understood as used in a philosophical discourse. Philosophical discourse may involve a more technical vocabulary, but it is still subject to the same rules of English as non-philosophical discourse. As such, a sentence like (69a) or (69b) can naturally function as a reply to a skeptic concerning the existence of collections or sums as entities of their own, above the individual members. Crucially, however, such a claim cannot be made by a sentence like (69a). That is, (69a) cannot possibly be used for a statement that a sum or group exists as such, as an entity beyond the individual group members.

The generalization about predicates and readings of predicates requiring plurals can be stated as below:

(70) The Plurality Constraint
A predicate or reading of a predicate that makes reference to the members of a plural argument (but not the plural argument as a whole) requires the argument to be denoted by a plural and not a singular count NP.

To account for the Plurality Constraint within the reference-to-a-plurality approach, two kinds of collective entities would need to be distinguished: first *pluralities*, the referents of definite plurals, and second *collective objects*, the referents of collective (singular count) NPs. On the reference-to-a-plurality approach, the Plurality Constraint will have the status of a semantic selectional restriction, that is, a restriction to a certain type of entity. The constraint then says that certain predicates or readings of predicates apply only to entities that are pluralities and not to entities that are collective objects.[13]

[13] Within the reference-to-a plurality approach, there are different ways of conceiving of the distinction between entities that are pluralities ("non-objects") and collective objects ("objects"). One of them is in terms of the notion of an integrated whole (Moltmann 1997a). Conditions of integrity may consist in conditions on the internal structure or organization of the collection, interrelations among the members of the collection that separate them from other entities, or in the overall function the collection plays in a particular context (Simons 1987). Singular count nouns, on that view, generally express essential or accidental integrity conditions. Formulated in terms of the notion of an integrated whole, the Plurality Constraint is called the "Accessibility Requirement" in Moltmann (1997a). The Accessibility Requirement says that predicates or readings of predicates that involve reference to the parts (but not the whole) of an argument require the argument not to be an integrated whole in the context of reference (in what I called a "reference situation").

One problem for this account is that there are a range of cases where the referents of singular count NPs display no manifest integrity, for example *the totality of Sue's belongings* or *the plurality of things* (!). Moreover, the account could not explain the behavior of the verb *exist*. There is no reason why *exist* should be predicable of an entity that has integrity, but not of one that does not. Finally, the Accessibility Requirement could not be generalized in order to account for the instance-related application of predicates with kind terms. Explicit property-referring terms and bare plurals and mass nouns do not differ in the sense that the former refer to integrated wholes and the latter do not.

The distinction between these two kinds of collective entities exhibits striking parallels to the distinction between properties and kinds that are "objects" on the one hand and kinds that are "non-objects" on the other hand. Pluralities would have the status of "non-objects," whereas collective objects would have the status of "objects." In particular, distributive readings, just like the instance-related readings of kind terms, would be possible only with non-objects, the pluralities.

However, there are some major differences between the Plurality Constraint with plurals and what I called the "kind term behavior" of kind terms. With a range of predicates, distributive readings with plurals are only optional. By contrast, instance-related readings are obligatory with all predicates, except if the predicate is itself already an instance-distribution predicate. It is thus not obvious that the same account should explain the Plurality Constraint and the kind term behavior of kind terms.

There is some evidence, though, that distributivity is, in a certain sense, obligatory even with plurals. It comes from predicates expressing size or configuration. Such predicates in principle could have both a collective and a distributive reading with definite plurals. However, with plurals, unlike with collective NPs, they enforce a distributive interpretation:

(71) a. The children are big (no collective reading).
b. The group of children is big (collective reading).

(72) a. The pictures are large (no collective reading).
b. The collection of pictures is large (collective reading).

With other types of predicates, by contrast, collective interpretations are unproblematic:

(73) a. The children surrounded the palace.
b. The men lifted the piano.

(74) a. The stones weigh 10 kilos.
b. The pictures take up a lot of space.

Another, rather common, way of conceiving of the distinction is in terms of the notion of an atom within an extensional mereological approach to plurals (Sharvy 1980, Link 1983, Simons 1987). On that view, definite plurals denote sums, entities in a domain ordered by a transitive part of-relation $<$ whose atoms are individuals. Singular count NPs, by contrast, denote atoms. Thus, *the children* denotes a sum of individuals, whereas collective NPs such as *the group of children* denote an atom relative to $<$. On this view, sums would be collections as many, whereas atoms would be collections as one. The Plurality Constraint stated in terms of the notion of an atom would require that predicates referring to the parts of an argument (but not the argument as a whole) apply only to non-atoms. "Kind term behavior" would have to be accounted for by distinguishing kinds that are sums, that is, sums of possible instances, and kinds that are atoms (*the Siberian tiger*). The condition then would be that predicates could apply to non-atoms only if they have a derived meaning or are instance-distribution predicates. The problem with the distinction between atoms and non-atoms is that the notion of an atom must be linked to the syntactic category of singular count nouns. It can hardly be understood independently of it. However, kind terms, we have seen, are not tied to a particular syntactic category, but can be bare plurals or mass nouns as well as singular definite NPs. (In Moltmann (1997), I argued that this also holds for the semantically relevant notion of plurality.)

(75) a. The people form an orchestra.
b. The pictures form a large collection.

The reason why the predicates in (73–75) and those in (71–72) behave differently must have to do with their descriptive content. What distinguishes the predicates in (73) from those in (71, 72) is that they describe the participation of a plurality in an event. In order for (73a) and (73b) to be true, a significant number of the group members each will have to contribute to the causation of the event described by the predicate. Such an additive relationship between the members of the plurality and a single entity specified by the predicate (say an event) also characterizes the predicates in (74) and (75). In (74a), each stone contributes to the overall weight of ten kilos and in (74b) each picture occupies its space in a region that amounts to a lot of space. In (75a), each of the people in question contributes to the constitution of the orchestra and in (75b) each of the pictures contributes to there being a "large collection."

The generalization then is that collective interpretations with plurals are possible only when the predicate allows for a re-analysis as a distributive predicate, describing the participation of individuals that are part of the plurality in an event or their contribution to another entity. If this is right, then pluralities would be just like property-resistant kinds: pluralities would be entities unable to bear the properties expressed by natural language predicates, except for those predicates that have a distributive interpretation or are re-analyzed as distributive predicates, or in fact predicates making reference to the parts but not the whole of the plurality. Predicates referring to the parts but not the whole of a plural argument are obviously on a par with instance-distribution predicates.[14] Such predicates generally describe just relations among the individual members of the plurality (or among subpluralities), rather than expressing a property of the plurality as such. This is why they can be predicated of pluralities as property-resistant entities.

Property-resistant kinds and pluralities do not behave the same with respect to the predicate *exist*. With pluralities, *exist* claims the existence of all the members of the collection; it cannot claim the existence of the collection as such, as an entity "beyond" the individual members. With property-resistant kinds, by contrast, *exist* claims the existence of some instance of the kind. Thus, in the case of pluralities, *exist* must apply distributively to each individual in the plurality, whereas with property-resistant kinds *exist* applies to the intension of the kind, yielding the truth value "true" just in case there are some instances of the kind.

The distinction between collective objects and pluralities that are "non-objects" is just as problematic as the distinction between objects and non-objects as a distinction among kinds. It raises the same substitution problem as we have seen with kinds:

[14] Recall that at least some instance-distribution predicates were possible with kinds that are objects, whereas the Plurality Constraint prevents predicates subject to the Plurality Constraint applying to collective objects. On my view, this is because of the particular meaning of instance-distribution predicates and does not challenge the parallel between plurals and kind terms.

why couldn't a plurality be referred to by a suitable singular noun phrase, such as *this plurality, that sum*, or *that entity*? Most strikingly, the difference between collective NPs and plural NPs shows up in the way collective objects and pluralities are counted. Collective objects, referents of collective NPs, always count as "one," whereas pluralities, referents of plural NPs, always count as "many." Thus, there is one orchestra, but several orchestra members, and if *the collection* has a referent, there is just one collection, but several members of the collection.

This fundamental difference between collective objects and pluralities, that is, "collections as one" and "collections as many," has been the subject of important philosophical discussions going as far back as Plato. It is a difference, though, that does not come out as such on the standard semantic account of plurals. Why should a plurality (collection/sum) be something that counts as "many" when that very same entity is also the referent of a collective NP such as *that plurality* (or *that collection* or *that sum*), and thus counts as "one"?

The distinction between collective objects and pluralities (as non-objects) also raises the problem of the absence of coercion that we have seen with kind terms. Thus, (76a) and (76b) do not allow for any reading on which *that sum* or *the class* has been "coerced" from the type of singular count NPs to the type of plurals, switching from a referent that is a collective object to a referent that is a plurality:

(76) a. John counted that sum.
b. John cannot distinguish the class.

The constraint in question is thus fundamentally different from familiar semantic selectional requirements. Whereas the latter allows for coercion, the former just does not. For this reason, it is not plausible that the Plurality Constraint is a semantic selectional requirement.[15]

6.2. Plural reference

The second approach to the semantics of plurals, the plural-reference approach, takes definite plural NPs not to refer to a single entity that is a plurality, but rather to several individuals at once. On that view, *the children* does not stand for a single entity that is a collection of children, but rather for each individual child at once. This approach to plurals has been pursued mainly by philosophical logicians such as Boolos (1984), McKay (2006), Oliver/Smiley (2006), Rayo (2002, 2006), and Yi (2005, 2006).

The plural-reference approach to definite plurals makes use of plural logic, a logic that contains both plural terms and plural variables. Plural terms are terms that may stand for several individuals at once; plural variables are variables that may take several individuals as values at once. A one-place predicate that can be true of the various individuals is a *plural predicat*e. An atomic formula of the sort Pt, with P a one-place

[15] There are further potential problems for the reference-to-a-plurality approach discussed in the literature. They are specific to plurals and do not carry over to kind terms (Yi 2005, McKay 2006, Rayo 2002).

predicate and t a plural term, is true just in case P holds of all the individuals that t stands for at once. A predicate with several argument positions has a *plural argument position* if the predicate can be true of several individuals at once for that argument position.

The plural-reference approach accounts for the Plurality Constraint in a straightforward way. Given that approach, the Plurality Constraint simply says that certain predicates or predicates on a certain reading need to apply to several arguments at once (with respect to the relevant argument position) and cannot apply to a single collective object (on the relevant reading).

Plural predicates may be collective or distributive (with respect to the argument position in question). Given the plural-reference approach, distributive (one-place) predicates can be characterized as below, where "xx" is a plural variable:

(77) A one-place predicate P is (strictly) distributive iff for any xx, if P is true of the xx, then P is true of x, for all x < xx.

A major issue in the more recent literature on plurals is the possibility of predicates distributively applying to contextually given subgroups (Moltmann 1997, Schwarzschild 1996, Gillon 1987). I will set the question aside how the individuation of subgroups can be accounted for within the plural-reference approach since it will hardly bear on issues regarding apparent reference to abstract objects. For the present concerns, it will suffice to make sure that a predicate that is true of several individuals *xx* at once and that is also true of several individuals *yy* at once is also true of the individuals *zz* at once that are among the *xx* or among the *yy*:

(78) For pluralities xx and yy, if a one-place predicate P is true of xx and of yy, then P is true of zz such that xx < zz, yy < zz, and for no ww, ww < zz, and ¬ ww < xx and ¬ ww < yy.

There is another type of predicate besides plural predicates that can take plural arguments. These are multigrade predicates (Oliver/Smiley 2004, Taylor/Hazen 1992). A multigrade predicate is a predicate that can take an unlimited number of arguments. It typically combines with a list of terms, which generally takes the form of a conjunction, as below:

(79) John added two and two and two.

Add is a multigrade predicate, or more precisely, it is a predicate that has two argument places (one for the subject and one for the object) and is multigrade in its second place: the second place of *add* allows for an unlimited number of arguments, each occupying a different *position* within the second place of *add*. The second place is not a plural argument position because an entity for that argument position can appear more than once (the number two occurs three times as an argument of the second position of *add* in (79)). Moreover, the order of the entities may matter. This is why the arguments

of a multigrade argument place of a predicate may be presented by a list, so that the individual items in the list fill in the positions of the multigrade place.

Just as the predicate *add* in (79) is multigrade with respect to its second place, there are expressions that are multigrade functors, taking an unlimited number of entities in a certain order as arguments. Examples are the functors *sum* and *sequence*:

(80) a. the sum of two and two and two
b. the sequence of two and one and two

A multigrade predicate (or a multigrade argument place of a predicate) may itself be plural or in fact multigrade with respect to one of its positions, and in the latter case, the multigrade position may itself be multigrade or plural with respect to any of its positions. Formally, elements in the denotation of such a predicate would require multiple indexing, the first index marking the argument position of the predicate as such, the second index the place within the multigrade position, and so on (Taylor and Hazen 1992). In this chapter, predicates with such complex multigrade argument structures will not play a role, though. (However, they will play a role later in Chapter 4 when attitude verbs are analyzed as multigrade with respect to the position occupied by a *that*-clause.)

What is striking about multigrade predicates or functors is that they can generally also combine with a plural term, which thus seems to fulfill the same function as a list:

(81) a. John added those numbers.
b. the sum of these numbers
c. the sequence of those numbers

Rather than taking such predicates or functors to be ambiguous between a plural and a multigrade version (or rather being of two different types), I will take the relation between plural term and predicate to be interpretable in two distinct ways. The plural term may provide either arguments for a single argument place of the predicate or various arguments (in some order) for a multigrade argument place, for the various positions in that place. If the second interpretation is considered a derived interpretation, it may be represented by applying a functor "f" to a plural predicate as below:

(82) For a multigrade predicate P and a plurality pp,
f(P) is true of pp iff for some function g mapping natural numbers onto the elements of pp, P is true of g(1), g(2), . . .

Obviously, for the truth of the combination of a predicate with a plural term under F, the order of the arguments given by the plural term does not matter.

Thus, natural language contains both plural and multigrade predicates as well as plural and multigrade functors.

Using multigrade predicates might also account for plural predicates with higher-level pluralities, as on one reading of (83):

(83) John cannot distinguish the boys and the girls.

On the relevant reading of (83), John cannot distinguish the boys from the girls. If *distinguish* is considered a multigrade predicate in its second position, then this reading can be accounted for by taking the boys to occupy one argument place of the multigrade place of *distinguish* and the girls another.[16]

For the relevant reading of (83), it is not necessary to reify pluralities. However, reification of pluralities is sometimes required. Certain quantifiers not only range over pluralities, but also count them, namely quantifiers of the type *something, several things, everything*, or *nothing*. These are the *special quantifiers* already mentioned earlier (and which will be discussed in detail in Chapter 3, 4, and 5). The examples below illustrate that special quantifiers can range over the pluralities of entities that definite plurals stand for:

(84) a. There is something John ate, namely the peas.
b. There is something John did not notice, namely the children.

The crucial observation is that special quantifiers may range over "distinct" pluralities and in fact count them:

(85) a. John cannot distinguish several things, the peas, the apples, and the leaves.
b. John has counted many things in the market (the peas, the apples, the oranges, the lemons, the mangos, and the pears).

This means that special quantifiers like *several things* or *many things* enforce a switch from mere pluralities ("pluralities as many") to collective entities that correspond to the pluralities ("pluralities as one").

Why should special quantifiers have that effect? The effect special quantifiers have with plurals can be related to another semantic role of special quantifiers. Special quantifiers in general have the ability to replace non-referential complements (such as predicative or clausal complements) and introduce "new entities" into the semantic structure for the purpose of predication and counting. (86) gives an illustration, though this will be discussed in much greater detail in subsequent chapters:

(86) John is something admirable, namely wise.

As I will discuss in Chapter 3, *something admirable* in (86) does not range over entities that are denotations of predicative complements and thus arguments of the copula verb. Rather it introduces entities into the semantic structure based on meanings of possible

[16] On a second reading of (83), *distinguish* has a distributive interpretation, meaning "John cannot distinguish the boys and he cannot distinguish the girls." This reading may be accounted for by taking *and* to take scope over the verb and *distinguish* to be a plural predicate with respect to its second position (taking the boys as well as the girls as arguments).

predicative complements, entities one would refer to with NPs like *John's wisdom* or *wisdom*. *Something* in (86) thus is a nominalizing *quantifier*.

The nominalizing function of special quantifiers in the place of non-referential complements gives an independent motivation for a nominalizing function of special quantifiers in the place of definite plurals. In that context, the quantifiers will have a nominalizing function by introducing entities based on pluralities. Those entities might simply be taken to be mereological sums of pluralities, that is, entities whose existence should not require anything further than the existence of their parts (and thus no particular connections among the parts). Clearly, the required reification function cannot be a total function mapping every plurality onto an object, but must be a partial function, for the simple reason that there are more pluralities than objects.

Reification of a plurality as a single object goes along not only with the use of special quantifiers; it also goes along with a range of collective nouns. Collective nouns such as *collection, class*, or *group* can themselves combine with a definite plural:

(87) the collection of the toys

Such nouns express a two-place relation with one plural argument position and one argument position for collective objects. The entire definite NP in (87) will refer to a collective object, an object whose members are just the individual members of the plurality (possibly but not necessarily constituted by unity-defining conditions). Collective nouns on a functional use as in (87) will involve reification as part of their lexical meaning, a partial mapping of a plurality onto a collective object.

6.3. Modalized plural reference

The plural-reference approach to plurals can now be carried over to kind terms, that is, in particular bare mass nouns and plurals. Then kind terms will be plurally referring terms that refer to all the instances of the kind in different possible worlds, at different times. The instances will be quantities, individuals, or tropes. I will call the plurality of such possible instances (a plurality as "many") *a modalized plurality*. The various kind-related readings that predicates display with kind terms can then be construed as derived predicate meanings, applying to a modalized plurality. Modalized plural reference will be a way of understanding a kind "as many" as opposed to a kind "as one."

Many kind predicates care not only about actual instances, but also about merely possible instances. This is the case for "individual-level predicates," for intensional predicates, as well as, to an extent, for instance-distribution predicates such as *rare*. Clearly, all the predicates possible with kind terms can be understood as predicates applying to modalized pluralities. However, predicates will have derived predicate meanings when applying to modalized pluralities that are not the same as when applying to ordinary pluralities. The derived predicate meanings applying to kinds generally involve quan-

tification over possible instances, or even possible or actual subpluralities (because of the possibility collective predicates discussed earlier).

The derived meanings of predicates applied to modalized pluralities will generally be based on the ordinary meanings of predicates. Thus, characterizing predicates will have a derived meaning involving quantification over normal circumstances, standing in a relation *R* to the actual one and some contextual condition *C* of, roughly, relevance in a circumstance, as below, where "pp" is variable for modalized pluralities and < the relation "are among":

(88) For a characterizing predicate *P*,
$[P_{ext}] = \lambda i\ \lambda pp[\forall i'(i\ R\ i' \rightarrow \forall xx\ (C(xx, i')\ \&\ xx < pp\ \&\ P_i(xx)))]$.

Episodic predicates will involve just existential quantification over the 'parts' of the plurality of actual things, that is, entities in the domain *D(i)* (a plurality of objects) for the relevant circumstance *i*:

(89) For an episodic predicate P,
$[P_{ext}] = \lambda i\ \lambda pp[\exists xx\ (xx < pp\ \&\ xx < D(i)\ \&\ P_i(xx))]$.

The derived meaning of intensional predicates will approximately be as below, where "s" is a variable for situations and "$\models$" the relation of truthmaking that holds between a situation and the entity described by the relevant nominalization P_{nom} of the predicate *P* (see Chapter 2 (Appendix) and Chapter 5):[17]

(90) For an intensional transitive predicate *P*,
$[P] = \lambda i\ \lambda d\ \lambda pp\ [\forall s\ (s \models P_{nom}(d) \rightarrow \exists xx(xx < D(s)\ \&\ xx < pp\ \&\ R_s(d, xx)))]$.

For the particular case of *exist*, we have (91):

(91) $[exist_{ext}] = \lambda i\ \lambda pp[\exists xx\ (xx < pp\ \&\ xx < D(i)\ \&\ exist_i(xx))]$

Instance-distribution predicates applying to modalized pluralities are different in that they do not apply with an underived meaning to individuals or actual subpluralities. Rather they hold of a modalized plurality in case a certain condition obtains that consists in quantification over the instances that are part of the modalized plurality. Thus, *rare* has approximately the following meaning, where 'p' is a variable for locations:

(92) $[rare] = \lambda i\ \lambda pp\ [RARE\ p\ xx\ (xx < pp\ \&\ AT_i(xx, p))]$

Kind terms as modalized plural terms need to be distinguished from definite plurals standing for pluralities of possible instances. The latter do not display the relevant readings of episodic, intensional, and existence predicates:

[17] Chapter 5 will give a slightly different account of the meaning of transitive intensional verbs, making use of Davidsonian event semantics.

(93) a. John found the possible instances of gold.
b. John needs the possible instances of gold.
c. The possible instances of gold exist.

An explanation of this difference should be along the following lines. Definite NPs involving a single domain of entities, which in the presence of *possible* will be extended to a domain of merely possible entities. By contrast, kind terms involve plural reference to different individuals in different domains, belonging to different circumstances.

Kind terms as plurally referring terms also allow for higher-level plural reference. Here is a first example:

(94) a. John cannot distinguish apples and pears.

(94a) has a reading on which John cannot distinguish apples from pears and vice versa. Here *distinguish* applies as a multigrade predicate (in its second position) to the modalized plurality given by *apples* and the modalized plurality given by *pears*. (94a) has a second reading on which *distinguish* applies to a single modalized plurality, that consisting of the various possible apples and pears. What John is said to be unable to distinguish on that reading is the individual members of that plurality. On the first reading, *and* forms a list of two plural arguments for a multigrade argument position; on the second reading, *and* forms a single plural term referring to both the referents of *apples* and the referents of *pears* at once.

Higher-level readings are available also for (94b), with the *kind-of* construction:

(94) b. John cannot distinguish these kinds of apples.

(94b) has in fact two readings. On one reading, *distinguish* distributively applies to each individual kind, so that (94b) means that John cannot distinguish the apples of one kind from each other, and so for the apples of the other kinds. On the other reading, (94b) means that John cannot distinguish one kind of apple from another. On that reading, *distinguish* takes the various kinds as arguments for its multigrade second position. Both readings involve higher-level plurality as specified by the plural of a kind-denoting term—in the first case, the corresponding singular kind term will govern the distribution of *distinguish,* and in the second case, it will specify the plural arguments for a multigrade argument position of the predicate.

In both cases, one might consider the sortal *kind* to set up contextually relevant subpluralities, defined by relations of similarity or "belonging to the same kind." This would avoid reifying pluralities and modalized pluralities in particular. However, making use only of contextual divisions into subpluralities is not always possible. Just as in the case of plurals, there are contexts in which kinds (modalized pluralities) require reification since they are themselves the objects of counting in those contexts. Reification is required both for the count quantifier *several kinds of apples* and the count quantifiers *various things*, *several things*, and *two things* below:

(95) a. John can distinguish several kinds of things.
b. several x ∃pp(kind(x, pp) & distinguish(John, pp)).
c. John faced various things, hostility, incomprehension, and prejudice.
d. John needs two things, new ideas and good co-workers.

Thus, the same reification function mapping pluralities to entities applies here as in the case of plurals. This reification is part not only of the meaning of *–thing*, but also of the meaning of *kind*.

Quantificational NPs like *several kinds* and *several things* thus have two semantic functions: that of quantification and that of reification of pluralities. To fulfill these two semantic roles, such quantificational NPs should not only be assigned a scope but also a nominalization domain. The nominalization domain consists of the material in the sentence that forms the basis for the reification. The distinction between nominalization domain and scope will also be important for occurrences of special quantifiers in the place of predicates (Chapter 3). There are different ways of interpreting the nominalization domain. In the present case, the nominalization domain consists just of the trace in referential position left behind by the quantifier when moving to its scope position at Logical Form. In this case, the nominalization domain can be interpreted by quantifying over pluralities, which will fill in the argument position of the predicate and at the same time form the point of departure for reification. Thus, the Logical Form of (96a) in (96b) will be interpreted as in (96c):

(96) a. John distinguished several things.
b. $[\text{several things}]_{ik}$ $[_i$ John distinguish $[_k$ e]]
c. several x ∃pp (x = reif(pp) & distinguish(John, pp))

Quantifiers with the morpheme *-thing* allow reification of pluralities or actualized pluralities; quantifiers with *kind* only allow reification of modalized pluralities. *Kind* as part of a nominalizing quantifier can be taken to express a relation between kinds that are objects (let us say sums of modalized pluralities) and objects. Then (97a) can be analyzed as in (97b):

(97) a. John distinguishes several kinds of things.
b. several x ∃pp(kind(x, pp) & distinguish(John, pp))

There is further evidence for the reifying function of the noun *kind*. It has to do with a difference between two sorts of plural or kind predicates. One sort is exemplified by *count* and the other by *distinguish*. *Count* must apply to pluralities whose relevant parts are true objects; by contrast, *distinguish* can apply to pluralities with contextually relevant subcollections that do not necessarily count as objects. Thus, (98a) can have a reading on which John distinguished one plurality, the men, from the other, the

women; by contrast, (98b) could not possibly have a reading on which John counted "two":[18]

(98) a. John distinguished the men and the women.
b. John counted the men and the women.

Similarly, (99) cannot have a reading on which John counted "two," counting the kind apples and the kind pears:

(99) John counted apples and pears.

By contrast, the reading on which John counted kinds is available in (100a), and a similar reading with another reifying noun, *quality,* in (100b):

(100) a. John counted the various kinds of apples.
b. John listed the various qualities.

This again shows that NPs with the head noun *kind* reify kinds as objects, which bare mass nouns and plurals cannot do, the reason being that bare mass nouns and plurals are plurally referring terms.

7. The semantics of explicit property-referring terms

Explicit property-referring terms, we have seen, behave fundamentally differently from kind terms. In this section, I will give only a brief sketch of a semantic analysis of explicit property-referring terms. I will also add some further semantic generalizations about such terms.

I will focus on explicit property-referring terms of the form *the property of being wise* with a gerund *being wise*. Such terms are syntactically complex: they are composed of the noun *property* (or a similar noun such as *attribute* or *virtue*) and a gerund, an expression derived from a VP but with the syntactic status of an NP. I will call the latter *the denominative complement*. I take the semantic contribution of the gerund to be just that of a predicate. The form of a gerund would thus have syntactic reasons only. (Note that no adjective can appear after a noun with the relevant semantic role.) The gerund will then contribute a predicate as it occurs as the main predicate of a sentence (*the property of being long and hard, the property of being long or short, the property of having angles, the property of resembling a stone*, and so on).

A property as a referent of an explicit property-referring term differs from a kind that is a plurality of possible instances not just in that it is a single object, a "property object." It also displays a range of properties that kinds could not have, neither as pluralities nor

[18] On a second reading, John cannot distinguish the boys from each other, and he cannot distinguish the girls from each other. I will leave an analysis of this reading within the plural-reference account for another occasion.

as objects. These are in particular logical and semantic properties, as illustrated by the following contrasts:[19]

(101) a. The property of being pure is negative.
b. Purity is negative.

(102) a. The property of being honest is complex.
b. ?? Honesty is complex.

(103) a. The property of being universally recognized is quantificational.
b. ?? Universal recognition is quantificational.

(104) a. The property of being poor is vague.
b. ?? Poverty is vague.

(105) a. The property of fatherhood is relational.
b. ?? Fatherhood is relational.

Being negative, complex, vague, and relational are properties of predicates, and in this particular construction, they act as properties of the predicates from which the explicit property-referring term is built. They are not properties of the instances of the kind.

Underived bare mass nouns and plurals lead to the same sort of contrast, as in (106a, b), due to Manfred Krifka (personal communication):

(106) a. The property of being a round circle is contradictory.
b. ?? Round circles are contradictory.

The applicability of such predicates to explicit property-referring terms is indicative of a particular way in which property objects obtain their properties. It suggests that in general a property object that is referent of a term of the sort *the property of being* P obtains its properties from the predicate P (or a synonymous one). Thus, whereas kinds that are objects inherit their properties from typical instances, property objects inherit them, in some way or another, from the corresponding predicate.

Rather than being inherited from the corresponding predicate, a property object may also be attributed properties on the basis of the predicative construction itself, such as "the property of being had by John," as in the valid inference from (107a) to (107b):

(107) a. John is wise.
b. John has the property of being wise.

Thus, the entity denoted by *the property of being* P can in particular sentences be attributed just those properties that can in some way or another be "read off" true sentences in which the predicate P (or a synonym) can occur or that are inherited

[19] Note also the possibility of forming negative, quantificational, and disjunctive property-referring terms, which is of course not possible with bare nominalizations (*the property of not being tall, the property of being in love, the property of being too tall or too small*).

in some way from P. The view thus is that property objects are "derived objects" in the sense that they are entities whose nature is exhausted by the ways properties can be attributed to them on the basis of sentences in which the corresponding predicates occur. In that sense, they are "shadows of properties" or what Schiffer (1996) calls "pleonastic entities." That is, there is nothing more to them than what is derivable from conditions such as those governing the transition from (107a) to (107b).

The noun *property* in explicit property-referring terms has a particular reifying role. It introduces a property object based on a predicate P, in such a way that the introduced property object is to be understood as an entity all of whose properties are to be read off, in some way or another, from true sentences in which P occurs. Given that the complement of *property* is in fact a gerund rather than a predicate, the reifying function expressed by *property* will apply in fact to the "denominalization" of the gerund, that is, to the adjective from which the nominalization is derived. Thus, the entities that explicit property-referring terms introduce can be characterized by conditions of roughly the following sort, where denom(N) is the denominalization of N:

(108) For a gerund N
- [1] [*the property of* N] is instantiated by (is had by) an object *d* iff denom(N) is true of *d*.
- [2] [*the property of* N] is *P* for a property if *P* is a semantic property of denom(N).
- [3] [*the property of* N] is identical to [*the property of* N'] iff N and N' have the same meaning.

Attitudinal relations such as "look for" or "admire" or evaluative properties are, of course, not attributed to property objects in that way. Rather they can apply to a property object individuated in the way of (108) directly.

There is a natural sense in which bare mass nouns belong to the center of language, whereas complex expressions such as *the property of* N belong to its periphery, being suggests restricted to philosophical uses of language. The following picture then suggests itself. True reference to abstract objects is something that takes place at the periphery of language, whereas at the center of language we rather have reference to a plurality of particulars. The notion of an abstract object, given this picture, is one according to which abstract objects are derived objects: they are objects whose nature is a reflection of the semantic contexts in which the corresponding predicate can occur.

Explicit property-referring terms may also contain a bare mass noun instead of a gerund:

(109) the property of wisdom/honesty/modesty

There is a restriction, though, on what sorts of bare nouns can act as attributive complement of *property*. It can only be a bare adjective nominalization and not an underived mass noun or a plural, in contrast to the construction with gerunds:

(110) a. ??? the property of water/lions/humans
b. the property of being water/a lion/human

Here is a suggestion as to why this restriction holds. The restriction obviously has to do with the kind of instances that the bare noun refers to: the instances can only be tropes, not quantities or individuals. What distinguishes tropes from quantities and individuals is that tropes are entities dependent on their bearer: they are entities that stand in a particular relation, let us call it "attribution," to their bearer, a relation that individuals and quantities cannot enter to other entities. This relation also holds derivatively for individuals and kinds of tropes: an individual stands in the relation of attribution to a kind of trope derivatively if it stands in that relation to an instance of the trope. The relation of attribution is the ontological analogue of the relation of predication in which individuals stand to a predicate, and this introduces a general constraint on the introduction of property objects. Explicit property-referring terms with bare nominalizations introduce property objects on the basis of entities attributable to individuals, in a way parallel to how explicit property-referring terms with gerunds introduce property objects on the basis of a predicate.[20] Kinds of objects or quantities do not involve the relation of attribution, and thus property objects could not be introduced based on them.

If bare mass nouns are modalized plural terms, then the head noun *property* in *the property of wisdom* expresses a function taking a plurality as argument and mapping it onto a single object. This function obviously needs to be partial. For reasons of cardinality, not for every plurality can there be a corresponding object.

Nouns like *property, attribute*, and *virtue* can have a reifying function also in predicate position, as in the sentences below:

(111) a. Courage is an admirable property.
b. Friendliness is my favorite attribute.
c. Honesty is a virtue.

These are not ordinary subject–predicate sentences in which the predicate expresses a property attributed to the subject referent. The subject in these sentences is a kind term and thus cannot stand for a property object, the kind of entity demanded by the predicate.

One might argue that the predicate in such sentences triggers coercion, that is, type shift of the subject referent from a kind to a property object. However, the following sentences indicate that this is not the case:

[20] Some differences between the two kinds of explicit property-referring terms are expected though. Property objects introduced on the basis of tropes should not have semantic properties that originate as properties of predicates. In fact, predicates like *is conjunctive, is negative, is quantificational* are harder to predicate of property objects introduced by the terms *the property of wisdom, the property of purity*, or *the property of universal love*.

(112) a. True courage, which one sees only rarely, is an admirable property.
b. True courage is an admirable property, even though one sees it only rarely.

In (112a), a non-restrictive relative clause requires the subject to refer to a kind rather than a property. In (112b), the pronoun, which is anaphoric to the subject, refers back to a kind, rather than a property.

That the predicate in the examples in (111) has a reifying function is supported by the readings of modifiers that the sortal head noun allows. For example, *interesting* and *vague* below are understood as modifiers that apply to a property object, not a kind:

(113) a. Ordinariness is a property that is interesting.
b. Tallness is a vague property.

This means that *property* has the same reifying function in (113a, b) that it has in explicit property-referring terms: it maps a plurality of instances onto an object that is a property. (113a) can then be analyzed roughly as "courage is something whose reification is an object that is admirable":

(114) [*Courage is an admirable property*] = λx[admirable([*property of*](x))]([*courage*]) = [*admirable*]([*property of*])([*courage*])

A potential alternative to analyzing (111a–c) as reifying constructions would be to take the copula to be the *is* of constitution rather than the *is* of predication (a kind of trope thus would have to, in some sense, "constitute" a property). This might work for (111b), but it will not work for (111a, c). For the account to work for (111a), the NP *an admirable property* would have to be understood as a quantificational, not a predicative, NP. That is, (111a) would be interpreted as "for some admirable property P, courage constitutes P." This raises a problem when the sentence is negated. Unlike what the analysis predicts, in (115a), *an admirable property* cannot take scope over the negation, with the reading in (115b):

(115) a. Courage is not an admirable property.
b. For an admirable property P, courage is not P.

Thus, there is good reason to take the predicative construction in (111) to be a reifying construction as well, with the predicate having first a reifying and then a predicative function.

2

Reference to Tropes and the Ontology of Tropes

The first chapter was about NPs that apparently refer to universals, in particular bare adjective nominalizations such as *wisdom, redness, beauty*, and *happiness*. I argued that such terms are in fact kind terms standing for kinds of tropes or particularized properties. This means, on the account I proposed, that they plurally refer to all the possible tropes in the various circumstances (worlds and times). There are corresponding terms for the instances of those kinds—more precisely, terms for the individual tropes that make up the pluralities of tropes with which kinds are identified. These are terms like *the wisdom of Socrates, the redness of the apple, the beauty of the picture*, and *the happiness of John*. In most of the literature on tropes, such terms are considered trope-referring terms and they are generally used whenever particular examples of tropes are given or discussed. Our intuitions about tropes as an ontological category are in fact rather directly reflected in the linguistic behavior and appropriate use of such terms. Trope-referring terms in natural language provide a straightforward way of clarifying our intuitions about tropes and help clarify the ontology of tropes itself.

This chapter will focus on reference to tropes and the ontology of tropes as it is displayed in the semantics of natural language. We will see that reference to tropes in natural language is extremely pervasive and rich. We will also see that reference to tropes in natural language requires a much more complex ontology than the standard ontologies of tropes found in the philosophical literature.

I first give a brief overview of contemporary and historical trope theory and present the various characteristics of tropes in the way they are reflected in natural language. I will thereby contrast tropes with related sorts of entities, such as states and facts. Particular attention will be given to certain sorts of tropes that play a significant role in the semantics of natural language: [1] quantitative tropes, including number tropes, [2] tropes with "variable objects" as bearers as well as "variable tropes," and [3] the sorts of tropes that nominalizations of gradable and relative adjectives refer to. Tropes display both semantic and ontological similarities to events. I will argue in favor of both tropes and events acting as implicit arguments of verbs and adjectives respectively. However, I will also discuss an alternative approach in an appendix to this chapter, namely the view that events and tropes play the role of truthmakers. Concerning the ontology of tropes and events and their relation to each other, I will propose a particular way in

which events may be conceived in terms of tropes. Tropes are more fundamentally distinct from states and facts. At the end of this chapter, I will sketch an account of states and fact as entities abstracted from true sentences or concepts.

1. Tropes in philosophy

1.1. The recent philosophical tradition

The term "trope" is a recent one, going back to the influential article of Williams (1953) which initiated a particular trope-based metaphysical view.[1] Williams' main interest in tropes, and that of philosophers following him (such as Mertz 1996, Campbell 1990, Bacon 1995, and Simons 1994), was to take tropes to form the basis of a one-category ontology, an ontology that aims to reduce all categories of entities to that of tropes. Williams proposes that properties be identified with maximal classes of similar tropes and material objects with maximal bundles of co-located tropes. Such a one-category ontology is based on three fundamental notions: tropes and the relations of similarity and collocation among tropes. The one-category trope-based ontology is far from uncontroversial, though. The construal of objects as bundles of tropes in particular raises many issues, but construing properties as classes of tropes is not without problems either.[2]

While Williams' view has given rise to lively philosophical discussions and stimulated much further work within the project of a trope-based one-category ontology, the notion of a trope itself is in fact quite independent of the particular metaphysical project of a trope-based, one-category ontology. The notion of a trope is a much older notion and had figured in various philosophical views since antiquity as one ontological category among others. There are also a number of contemporary philosophers that take an interest in tropes in this older, neutral sense, that is, without subscribing to a one-category ontology. They include Stout (1952), Strawson (1959), Wolterstorff (1970), and Lowe (2006).

1.2. Tropes in the history of philosophy

The notion of a trope goes back already to ancient philosophy and has a precedent in Aristotle's notion of an accident (especially in the *Categories*) and in the notion of a mode of the subsequent Aristotelian medieval philosophy, in particular Ockham (*Summa Logicae*).[3] Tropes also play a role in early modern philosophy

[1] There are other terms for tropes used by twentieth-century philosophers. Campbell (1990) uses the term "abstract particular." Bacon (1995) the term "property instance," and Wolterstorff (1970) the term "case."

[2] See Loux (1998) and Maurin (2002) for a discussion of the trope-based, one-category ontology.

[3] For a translation of Aristotle's *Categories* see J. Barnes, ed. (1984): *The Complete Works of Aristotle*, Volumes I and II, Princeton, NJ: Princeton University Press. For a translation of Ockham's *Summae Logicae* see M. J. Loux (1974), *Ockham's Theory of Terms: Part I of the Summa Logicae*, Notre Dame, IN.: University of Notre Dame Press. Complete Translation.

(Locke 1690) and well as in Husserl's (1913–21) phenomenology, where they are called "moments."[4]

Accidents play a central role in particular in Aristotle's early work the *Categories*, where they constitute one ontological category among four. The four categories consist of two categories of particulars: primary substances (material objects) and accidents (tropes); and two categories of universals: secondary substances, that is, universals that are instantiated by primary substances, and qualities, that is, universals that are instantiated by accidents. Crucial on the Aristotelian view is the distinction between *instantiating* a property and *having* a property. Tropes (accidents) *instantiate* qualities, whereas the individuals that are the bearers of the tropes *have* qualitative properties. Thus, "the wisdom of Socrates" instantiates "wisdom," but Socrates "has wisdom" or "is wise".

What about secondary substances or sortal universals? Aristotle later appears to have recognized a corresponding type of trope, namely "substantial forms." However, it is a common view among Aristotelian philosophers that sortal universals are instantiated by individuals, not tropes.

An important notion for the Aristotelian view is the relation of *ontological dependence*, which holds between the bearer of a trope and the trope. This means that a trope can exist in a world at a time only if the bearer of the trope exists in that world at that time. Furthermore, two tropes can be identical only if they have the same bearer, and thus generally a trope must have a unique bearer. There is also a sense in which universals depend on the plurality of their instances, namely in that a universal exists only if at least one instance exists (Lowe 2006).

Given the empirical generalizations presented in Chapter 1, the Aristotelian view appears rather strikingly reflected in the structure of natural language, in the following way. Bare plurals stand for sortal universals and the corresponding definite singular NPs for their instances (individuals). Bare adjective nominalizations stand for qualitative universals and the corresponding definite NPs (of either the sort *the wisdom of Socrates* or *Socrates' wisdom*) stand for the corresponding instances (tropes). In addition, the existence conditions on Aristotelian universals appear manifest in natural language, namely in the sense that a universal exists only if at least one of the instances exists.

1.3. Tropes and contemporary semantic theory

Despite the central role that tropes (as accidents or modes) have played in ancient and medieval metaphysics and philosophy of language, tropes have not played much of a role in contemporary semantics of natural language. Rather two other traditions have dominated linguistic semantics: Davidsonian event semantics and Montague Grammar. In Davidsonian event semantics, events, taken as primitive particular objects, act as implicit arguments of verbs. While tropes like Davidsonian events are particular,

[4] See Mertz (1996) for an overview of the history of the category of tropes in general.

primitive objects, there are a range of differences between events and tropes. Moreover, tropes will obviously play a different role in the semantics of natural language. Roughly, they play the kind of role in the semantics of adjectives that events play in the semantics of verbs, on the Davidsonian approach. While the Montagovian tradition does not specifically involve particular "minor" objects such as events or tropes, Montague Grammar makes rather generous use of intensional entities, such as properties, propositions, individual concepts, which are abstract entities construed in terms of possible worlds, times, and possible individuals. The focus of Montague Grammar was on formalizing a compositional semantic of part of natural language by assigning intensional entities of various sorts to expressions as their contribution to the compositional meaning of the sentence. The focus on events or intensional entities in these two traditions, however, appears not just motivated by considerations regarding natural language, but also by the particular philosophical influences at the time. Natural language displays reference to tropes in as obvious a way as it displays reference to events, as well as apparent reference to properties and propositions.

In ancient and medieval philosophy, tropes have in fact played a central role also in the semantic analysis of natural language. Thus, a sentence like (1a) was commonly analyzed as in (1b):[5]

(1) a. Socrates is wise.
b. There is a trope of wisdom that inheres in Socrates.

Tropes generally are associated with adjectives, just as events, at least since Davidson, are generally associated with verbs. Moreover, it is generally taken for granted that a term like *Socrates' wisdom* refers to a trope.

Coming from the event-semantic tradition, it is tempting to try to regard tropes as a particular type of event. Tropes, one might think, are just states and thus are the Davidsonian event arguments of stative verbs. However, we will see that tropes are fundamentally different ontologically from states. It will, moreover, become clear that tropes should not be classified as a type of event at all. Tropes differ in a range of properties from events. Events as property changes could perhaps be conceived on the basis of tropes, as changes of an object from bearing one trope to the bearing of a different trope, but certainly not vice versa.

2. Characteristic properties of tropes and their reflection in natural language

Let us next look more closely at the kinds of properties that tropes, in the context of the ontology of natural language, display. The goal of this section will be to clarify the kinds of properties tropes can bear as well as their relations to related categories of

[5] See Aristotle's *Categories* and Ockham's *Summa Logicae*.

entities, such as states, facts, and events. As in most of the trope-theoretic literature, I will take as a starting point the view that NPs with adjective nominalizations such as *the happiness of John* are trope-referring terms.[6] Trope-referring terms will contrast with explicit fact-referring terms such as *the fact that John is happy* as well as state-referring terms such as *the state of John's being happy* or *John's being happy*. We will see that natural language involves notions of states and of facts that do not agree with some of the notions customary in both philosophy and linguistic semantics.

2.1. Tropes as causal relata

Tropes as particularized properties are concrete entities at least as long as they have a concrete object as their bearer.[7] Tropes generally are taken to be concrete in the sense that they act as objects of perception and as relata of causal relations, and are spatio-temporally located. The causal efficaciousness and perceivability of tropes is well supported by linguistic intuitions; though we will see that the spatial location of tropes is more problematic.

That tropes can act as causes and as effects is reflected in the ability of trope-referring terms acting as subjects and complements of causal predicates or complements of causal nouns such as *effect* or *cause*:

(2) a. The heaviness of the bag she was carrying made Mary exhausted.
b. The humidity of the air caused the softness of the wood.

(3) a. the cause of the humidity of the air
b. the effect of the humidity of the air

[6] There are other uses of such NPs, though, on which they obviously do not refer to particular tropes, but rather to universals, noted by Wolterstorff (1970). Below, *Socrates' wisdom* acts as a term referring to a more specific universal than *wisdom*, namely the property everyone has that is wise in the same way as Socrates:

(i) a. John has the wisdom of Socrates.
b. John needs the wisdom of Socrates.
c. One only rarely finds wisdom/? the wisdom of Socrates.

This, however, seems to be an option limited to certain NPs referring to relatively well-established universals, such as *Socrates' wisdom*. For example, (ii) is rather hard to get, unless Mary's anger, let's say, is something quite well known:

(ii) ? John has the anger of Mary.

Thus, I will assume that this use is idiomatic. It is available only if a more specific universal has been established independently.

[7] It is less obvious that tropes which themselves have tropes as bearers are concrete if their bearer is concrete. Even though "the beauty of the landscape" is concrete, given the concreteness of the landscape, "the unexpectedness of the beauty of the landscape" hardly is. However, the latter arguably is a quasi-relational trope. Relational tropes certainly do not inherit concreteness from their bearers, since relational tropes may have both a concrete and an abstract object as their bearer. Other second-level tropes may very well be concrete, for example "the uniformity of the spottedness of the surface" (Section 2.3).

Not all tropes need to be concrete and thus causally efficacious, though. The roundness of the circle and the angularity of the triangle are tropes, but they are abstract and thus not causally efficacious. A trope is concrete just in case its bearer is.

One particular causal role of tropes is that of objects of perception, as in the sentences below:[8]

(4) a. John noted the redness of the apple.
b. John observed Mary's haste.

The role of tropes as objects of perception, in fact as the immediate objects of perception, has been one of the main motivations for positing tropes for trope theorists such as Williams, Bacon, and Lowe. Prior to the perception and recognition of objects, so it is argued, is the perception of tropes. Tropes can be perceived without thereby recognizing their bearer.[9]

Tropes thus differ from properties, which are abstract in the sense that they (on dominant views at least) are not causally efficacious and perceivable. Tropes also differ in that respect from facts and states.

Let us take facts to be simply what explicit fact-descriptions like *the fact that* S stand for. Similarly, states are simply what state-descriptions such as *John's being* V or *the state of John's being* V stand for. Facts do not act as objects of perception. Thus, predicates of direct perception like *see* are not applicable to facts:

(5) ? John saw the fact that it was raining.

Natural language treats states as equally abstract in that sense:

(6) a. John saw the beauty of the rock formation.
b. ?? John saw (the state of) the rock formation being beautiful.

Moreover, facts, as Vendler has argued, do not act as relata of causal relations, but only of relations of causal explanation.[10]

2.2. Similarity relations

Similarity is a relation of central importance for the notion of a trope. While objects can be similar to each other in various respects, tropes represent a single feature of an object. This allows tropes to always enter similarity relations in a unique way, that is,

[8] Explicit trope-referring terms that mention the bearer are not entirely natural as complements of *see*:

(ii) ?? John saw the redness of the apple.

This is perhaps because explicit trope-referring terms suggest the recognition of an object as the bearer of the trope, which would not make sense for a statement trying to describe the mere perception of a feature.

[9] In Moltmann (forthcoming (a)), I argue that this role of tropes is particularly well reflected in the use of bare demonstratives as subjects of identificational sentences, as below:

(i) Did you see that? That might have been Mary.

[10] Steward (1997) argues that this also holds for states.

respect-independently, or so it is thought. The standard view is that two tropes are similar just in case they instantiate the same property and two tropes are exactly similar just in case they instantiate the same natural property. Tropes that are exactly similar are qualitatively identical, yet numerically distinct. Two tropes that instantiate the property of redness are similar; yet one of the tropes may be a lighter and the other a darker shade of red, and thus the two tropes may not be exactly similar. But two tropes instantiating the very same shade of redness are exactly similar.

The way similarity relations apply to tropes is reflected in natural language not only in the application of the predicate *similar* itself, but also in the application of *the same as*. *The same as* in many contexts does not express numerical identity, but rather close or exact similarity:

(7) a. John's car is the same as Mary's.

The same as naturally applies to exactly similar (or very similar) tropes:

(7) b. John's happiness is the same as Mary's.

That *the same as* does not necessarily express exact similarity can be seen from comparing it with the *is* of identity. *Is* has to express numerical identity, as indicated by its inapplicability in the situation of (8a) as well as its inapplicability to similar, but numerically distinct, tropes as in (8b):

(8) a. John's car is Mary's car.
b. The happiness of John is the happiness of Mary.

Similarity relations among tropes play a central role for trope nominalism, the view that properties (as universals) are reducible to tropes. Trope nominalism generally construes properties as classes of similar tropes (Williams 1953, Campbell 1990, Bacon 1995). For universals, which are natural properties that are instantiated, the view has in fact significant plausibility. The property of a maximally specific shade of redness on that view is the class of all the exactly similar redness tropes. Trope nominalism has an obvious advantage over other forms of nominalism in that it allows distinguishing co-extensional properties with non-empty extensions, such as triangularity and trilaterality. If properties are identified with classes of individuals, triangularity and trilaterality will coincide (since the individuals that are triangular are exactly the individuals that are trilateral), but if properties are identified with classes of tropes, triangularity and trilaterality will be different (since the triangularity of an individual will never be its trilaterality).

For properties with empty extensions, trope nominalism is problematic, however, unless it identifies properties with classes of possible tropes. Trope nominalism also poses problems when applied to non-natural properties, which are the kinds of properties generally expressed by adjectives of natural language (Manley 2002). Adjectives of natural language generally do not express natural properties, and thus the tropes that

the nominalization of an adjective describes generally do not stand in the exact resemblance relation to each other. The property of redness would be the class of similar redness tropes. But then in a world in which the redness tropes are just the pinkish redness tropes, the property of being red would be identical to the property of being pinkish red. Similarly, in a world in which all the redness tropes there are are a dark orange redness trope and a light pinkish redness trope, the property of being dark red would be identical to the property of being pinkish red. That is, if properties are identified with classes of similar tropes, based on a looser relation than exact similarity, then there will not be a unique respect for the similarity relation to apply. To avoid the problem, the trope nominalist would have to identify properties with sets of possible tropes. Identifying properties of mere possibilia is not a very satisfactory choice for a nominalist, but it seems the only option.[11]

In the context of natural language semantics, it appears, involving possible tropes is unavoidable anyway. We have already seen that if terms referring to kinds of tropes are taken to be plurally referring terms, they need to be taken to refer to all the possible instances of the kind, not only the actual instances. Of course, the entire range of possible instances will constitute a class of similar tropes. Moreover, we will see later in this chapter that for various phenomena involving the semantics of adjectives, the use of possible tropes is indispensable.

2.3. Bearer dependence

Another relation that is of central importance for the notion of a trope is that of the relation of dependence between a trope and its bearer. This means that a trope exists only if its bearer exists and (more problematically) that a trope is identical to another trope only if the other trope has the same bearer. Because of the dependence of tropes on particular bearers, tropes are particulars rather than universals. John's happiness is particular to John, just as Mary's happiness is particular to Mary.

Tropes may also have other tropes as their bearer. Examples of such *second-level tropes* are the following:

(9) a. the unexpectedness of the beauty of the landscape
b. the profoundness of the redness of the square
c. the uniformity of the spottedness of the surface

Tropes with second-level tropes as bearers are third-level tropes, and so on. Higher-level tropes involve a change of similarity relations regarding the tropes that are their bearer. "The redness of the pear" may be "the same as" "the redness of the cube." However, "the unusualness of the redness of the pear" need not therefore be "the same as" "the unusualness of the redness of the cube." Higher-level tropes enter similarity relations independently of the similarity relations involving their bearers.

[11] Note also that complex tropes like "John's happiness" may be similar in various respects to other tropes of happiness.

Some tropes, those instantiating plural properties, may have several bearers at once. These are tropes whose bearers would be described by plural terms such as *the redness of the apples, the happiness of the children, the heaviness of the stones*, or *the diversity of the participants* (again assuming plural reference, rather than reference to a plurality for the corresponding plural terms). Tropes that have several bearers at once may be distributive tropes, such as "the redness of the apples" and "the happiness of the children," or collective tropes, such as "the heaviness of the stones" (on a collective understanding) or "the diversity of the participants." Collective tropes with a plurality as bearer are features that the bearers bear together. Distributive tropes raise the question about their own status as "one" or "many" in relation to the plurality of the bearers.

One important observation to make in that regard is that distributive tropes do not inherit a status as a plurality from their bearers. Distributive tropes generally are denoted by singular terms, not plural terms. Thus, even though *beauties* exists as a plural, the plural of the trope-referring term is *the beauty of the women*, not *the beauties of the women*; and it is *the redness of the apples*, not *the rednesses of the apple*s. Thus, for semantic reasons, trope terms derived from adjective nominalizations are generally mass terms, not plural terms. Given the view of plural reference as discussed in Chapter 1 (as opposed to the view of reference to a plurality), this raises the question whether definite mass terms are themselves plurally referring (referring to several quantities at once), or rather refer to the maximal relevant quantity in the context. For the sake of simplicity, in the present context, I will assume the latter. This means that definite trope terms with several bearers may refer to the sum of the tropes of the individual bearers, and thus that the domain of tropes is closed under sum formation.

There is another type of trope with multiple bearers, and these are relational tropes, that is, tropes that instantiate relations. Here are examples:

(10) a. the love between John and Mary
b. John's angriness at Mary

(11) a. the personal relation between John and Mary
b. the diplomatic relations between the countries

Like non-relational tropes, relational tropes enter relations of resemblance and depend ontologically on their bearers. What distinguishes relational tropes from tropes with pluralities as bearers is that the bearers of relational tropes occupy different argument positions or play different roles within the relation. This does not mean that the arguments have a particular order, even though this is generally the way they are represented linguistically. Relational tropes generally are described with a particular ordering among the arguments. Thus, in *John's relation to Mary*, John seems to occupy

a first argument place and Mary a second. However, nothing in the trope itself would tell that John occupies a first rather than a second place. The tropes could just as well be represented with the inverse order of the arguments. This problem, which arises in the same way for universals as for tropes, is the problem of neutral relations (Fine 2000). What is important for the arguments in a relation (particular or universal) is that they play a particular role in the relation, not that they are ordered in a particular way with respect to each other.

The linguistic representation of a trope may be misleading in another respect. Natural language may display an apparent difference between a relational trope and a monadic trope with a plural argument, for tropes for which the difference could not matter. Thus, there might not be an actual difference between a trope of the sort "the similarity between John and Mary" and "John's similarity to Mary" or between "the closeness of John to Mary" and "the closeness of John and Mary." That is, when a difference between argument places could not possibly matter, the relational trope is indistinguishable from the monadic trope with a plurality of arguments. In such a case, the distinction among argument places is merely formal and should therefore be considered the result of a purely lexical operation on a more appropriate underlying monadic representation.

There is a debate whether relational tropes are reducible to non-relational ones. While some philosophers take relational tropes to be reducible to monadic tropes, others consider relational tropes irreducible, a view I, myself, will adopt.[12] I will later distinguish relational tropes from quasi-relational tropes. Whereas relational tropes have more than one bearer, quasi-relational tropes have a single bearer, but they consist in the "relatedness" of an entity with respect to other entities, which is not the same as being a truly monadic trope.

Do all tropes have a bearer? There may be cases of tropes that come without a bearer. Sounds, for example, arguably are tropes that are bearer-less.

Some tropes appear not to have a unique bearer, without being tropes with pluralities as bearers of the sort as discussed above. These are tropes whose multiple bearers are linked either by relations of constitution or by functional part-whole relations. An example of the former kind is "the redness of the wool" and "the redness of the sweater" (made from the wool). Intuitively, these two tropes are the very same feature. An example of the latter is "the sharpness of the knife" and "the sharpness of the blade of the knife." Again, intuitively, these two tropes are the very same feature. That such cases involve one and the same trope is particularly clear from contexts of perception. One may perceive sharpness without thereby deciding whether it is 'the sharpness of the blade' or 'the sharpness of the knife'. Similarly, one may notice redness without thereby deciding whether it is 'the redness of the sweater' or 'the redness of the wool'. It is part of our intuitions about tropes that these two tropes are one and the

[12] Campbell (1990) is a proponent of the former view, Bacon (1995) and Mertz (1996) are proponents of the latter.

same.[13] With respect to a possible lack of a unique bearer, tropes differ from facts and states. "The fact that the knife is sharp" is not identical to "the fact that the blade is sharp" and "the fact that the sweater is red" is not identical to "the fact that the wool of the sweater is red." Similarly, "the state of the knife being sharp" is not identical to "the state of the blade's being sharp."

2.4. The problem of the spatio-temporal location of tropes

It is a common assumption that tropes, as long as they have a concrete bearer, have a location in space and time. Thus, the spatial location of a trope would be the spatial location that the bearer has while it has the property that the trope instantiates, and the temporal duration of a trope would be the time during which the bearer has the property that the trope instantiates.[14]

That tropes have a temporal location appears supported by linguistic intuitions. Trope terms like *John's happiness today* or *the softness of the surface yesterday* make perfectly good sense. There are also specific terms indicating the temporal duration of a trope, such as *the duration of John's happiness* or sentences such as *John's happiness did not last long*.[15]

The spatial location of a trope is much more problematic, though. Linguistic intuitions do not support tropes having a spatial location. Terms such as *the softness of the object on the table* are impossible if *on the table* is to locate the softness, rather than the object. Terms such as *the length of the softness of the object*, which should refer to the spatial extension of a trope, are entirely impossible. In addition, other predicates that should relate to the spatial location of tropes cannot in fact apply to tropes, such as *surround* or *be next to*:

(12) a. ?? The strength of the women surrounded the tree.
b. ?? The heaviness of the box is next to the heaviness of the vase.

[13] Lack of bearer uniqueness does not conform with the received view of ontological dependence, and there are two alternative proposals in the literature regarding cases of what appear to be tropes lacking a unique bearer. One such proposal considers such cases evidence for the relative independence of tropes from their bearer (Levinson 1980). Another proposal reduces them to a semantic phenomenon about trope-denoting terms (Schnieder 2004). Lack of bearer-uniqueness is not surprising, though, if objects may in general inherit certain properties from "lower-level" entities. As is familiar from the philosophical discussion of constitution, objects systematically "inherit" certain properties from the material that constitutes them or designated functional parts. Given a view of properties as particularized properties or tropes, it is then natural that objects may "inherit" certain tropes from their constituting material or from particular functional parts. A sweater will thus inherit the trope that is the redness of the wool constituting it. Similarly, objects will inherit certain properties from a functionally important part. Thus, the knife will inherit a sharpness trope from the blade that is its defining part. For a discussion of tropes lacking a unique bearer and alternative accounts see Moltmann (forthcoming (a)).

[14] That tropes have a spatial location is in fact a presupposition of approaches that aim to reduce individuals to tropes, by identifying them with bundles of compresent, that is, that co-located tropes (Williams 1953, Campbell 1990, Bacon 1995).

[15] Strawson (1953/4, 1959) doubts that tropes persist through time. He argues that there is no criterion that could tell whether a trope at a given time is the very same entity as a trope at another time.

The intuitions reflected in natural language indicate that tropes lack a spatial location, even though they may act as causal relata and as objects of perception. Tropes are ontologically dependent on a bearer, but they do not systematically share properties with their bearer, such as a spatial location.

The relation of a trope to the spatial location of its bearer is thus not one of inheritance, that is, tropes do not inherit a spatial location from their bearer. There is a different way of understanding the relation of a trope to the location of its bearer. According to Husserl, tropes necessarily go together with an extension, in the sense that they ontologically depend on a trope of extension (Simons 1994). On this view, a trope of softness will necessarily go along with a trope of extension, but what has the spatial extension is the bearer of the trope of softness, not the softness trope itself.

Facts are entities that lack both a temporal and a spatial location, but for very different reasons than tropes. States lack a location in space and do have a temporal duration, but again for different reasons than tropes:

(13) a. ?? The fact that it was raining lasted two hours/took place in New York.
b. John's being happy lasted only two years/?? took place in New York.

At the end of this chapter, I will sketch an account of facts and states that implies their lack of a spatial location.

2.5. Further properties of concreteness

Tropes, if their bearer is concrete, are concrete not only in such standard senses of concrete; they also have other characteristics of concreteness. These other characteristics distinguish tropes rather sharply from facts and states. They are what I call *groundedness, internal structure*, and *description-independence*.

2.5.1. Groundedness One important sense in which tropes are concrete is that tropes must be maximally specific. Unlike "redness" itself, which is unspecific as to any particular shade of redness, "the redness of the box" is maximally specific: it involves one very specific shade of the color. Moreover, unlike "happiness" as such, which can manifest itself in various ways, "John's happiness" involves a very particular manifestation of happiness, based on the various things that constitute John's happiness. Tropes are maximally specific and determinate because they are entities *in* the world. The world does not contain unspecific or determinable entities, or such is the general view.[16]

[16] This raises the question about the nature of tropes with pluralities of bearers, such as "the beauty of the women." One option is that it is a distributive trope, the sum of the beauty tropes of the individual women. Alternatively, one might consider it an "average" trope, a collective trope with the women as bearer. The latter, of course, would require a revision of the notion of a trope as standardly understood.

In general, the tropes that adjective nominalizations refer to are more specific than the properties expressed by the relevant adjectives. The reason is that the properties expressed by adjectives of natural language generally are not maximally specific. They are often determinable or quantificational in nature. Tropes actually need not themselves be instances of maximally specific properties. However, they must be composed of or grounded in instances of such properties.

This *groundedness* of tropes, as I will call it, is reflected well in linguistic intuitions regarding trope-referring terms. It is reflected, for example, in the way predicates of description and evaluation may apply to tropes. Tropes can be described and evaluated with respect to the particular way in which they manifest a property:

(14) a. John described Mary's beauty.
b. John admires Mary's beauty.

Tropes differ in that respect from facts and states. Facts and states are not grounded in the relevant sense. Facts and states consist just in the holding of a property of an object, without involving any particular way in which the property manifests itself in the object. Thus, they cannot be described or evaluated with respect to the particular manifestation of the property (Moltmann 2007):

(15) a. ?? John described Mary's being beautiful.
b. ? John admires Mary's being beautiful.
c. ? John described/admired the fact that Mary is beautiful.

The difference manifests itself also in the applicability of predicates of comparison. Predicates of comparison naturally apply to tropes, comparing particular property manifestations; but they cannot apply in that way to states or facts:

(16) a. John compared Mary's beauty to Sue's beauty.
b. ?? John compared (the state of) Mary's being beautiful to (the state of) Sue's being beautiful.
c. ?? John compared the fact that Mary is beautiful to the fact that Sue is beautiful.

Furthermore, groundedness is reflected in the applicability of the *exceed* predicate itself. "John's happiness" can "exceed" "Mary's happiness" because "John's happiness" consists in the particular way happiness manifests itself in John, and "Mary's happiness" in the particular way happiness manifests itself in Mary. "John's happiness" differs thus from "the state of John's being happy," which, being constituted only by John and by the unspecific property of being happy, cannot "exceed" "Mary's being happy."

Tropes are not states. Tropes involve the particular way the property in question manifests itself in the individual that is the bearer of the trope. States, by contrast, only involve the holding of the property of the individual and nothing else; states are nothing but the holding of a property of an individual. Thus, a statue's beauty will

involve all the particular properties of shape, color, and so on that the statue instantiates. A state, by contrast, will be individuated only by whatever property is expressed by the predicate in question, however unspecific and indeterminate. States thus are not grounded.

The following is a rough characterization of the groundedness of tropes:

(17) The Groundedness of Tropes
Tropes are composed of or based on instances of fully specific properties.

Most of the contemporary philosophical literature on tropes tacitly restricts its attention to tropes that are instances of "natural" properties. However, natural language predicates hardly ever express natural properties. Contemporary trope theory in that respect does not do justice to the range and the complexity of tropes that natural language in facts permits reference to.[17]

2.5.2. Description-independence Facts and states bear a close relation to the content of a canonical fact or state description, whereas tropes are entirely independent of the description used to refer to them. This is reflected in the fact that a trope can in principle be described in various different ways, whereas there is only a single canonical fact description for a given fact, that is, a description of the form *the fact that* S. The trope referred to as "the redness of the apple" may be exactly the same trope as "the intense redness of the apple." By contrast, "the fact that the apple is red" cannot possibly be identical to "the fact that the apple is intensely red." The nature of a fact is matched exactly by a canonical fact description. This also holds for states, whose canonical descriptions are of the form *John's being happy*, or *the state of John's being happy*.[18]

2.5.3. Internal structure and measurable extent A further difference between tropes on the one hand and facts and states on the other is that tropes can have a part–whole structure and a measurable extent, whereas facts and states cannot. This property is related to groundedness. Groundedness ensures some form of internal structure for tropes that are not simple instances of natural properties.

[17] Note that color tropes would not be instances of natural properties in the first place; yet a trope such as "the redness of the apple" is an instance of a fully specific property.

[18] Note that the description-independence of entities of a particular kind does not exclude that some predicates may be sensitive to the description used. The predicate *describe* is a predicate that is sensitive to the description used. This holds for individuals as well as for tropes:

(i) a. John described the book.
b. John described the romance novel.

(ii) a. John described the apple's redness.
b. John described the apple's intense redness.

Neither (ia) and (ib) nor (iia) and (iib) are equivalent even if the complements stand for the same object. For the description-sensitivity of *describe* see Chapter 3, Section 2.

Facts and states not only fail to be grounded. They lack any internal structure whatsoever, even if their canonical description is complex. This is reflected in linguistic intuitions, for example the applicability of the partitive construction, as in (18), the applicability of predicates of quantitative comparison (*exceed*), as in (19), and the applicability of *extent*, as in (20):

(18) a. all of Mary's happiness/talent/comfort/beauty
b. ??? all of the fact that Mary likes Bill—namely Mary, Bill, and the liking relation
c. ??? all of the state of Mary's liking Bill—namely Mary, Bill, and the liking relation

(19) a. Mary's happiness exceeds Bill's happiness.
b. ??? The fact that Mary likes Bill exceeds the fact that Mary is tall.
c. ??? The state of Mary's liking Bill exceeds the state of Mary's being tall.

(20) a. the extent of John's happiness
b. ??? the extent of the fact that John is happy
c. ??? the extent of John's being happy

That is, what generally are considered "constituents" of facts and states of affairs are not treated as parts of states or facts and do not contribute to their extent. Yet, even though facts have no internal structure and no extent, they obviously depend on various entities and properties. I will address this puzzle in the last section of this chapter when I sketch a general account of facts and states.

Tropes may have a part structure as well as an extent. However, tropes do not systematically inherit their part structure from their bearer. In general, tropes belong to the mass domain regardless of the part structure or unity of their bearer. For example, the trope "the redness of the box" or the trope "the solidity of the box" does not come with a part structure reflecting the part structure of the bearer. Other tropes like "the multi-coloredness of the statue" do seem to involve a structure, but that structure is independent of the part structure of the bearer. Whether a trope does or does not have a structure depends on the sort of quality it is, not on whether its bearer has a particular part structure.

There appears to be only one sort of property that tropes inherit from their bearers and these are "relations of neutral comparison," as I will call them, relations as expressed by *exceed*. Thus, inferences such as that from (21a) to (21b) are generally valid:

(21) a. John exceeds Mary in laziness.
b. John's laziness exceeds Mary's laziness.

That is, relations of neutral comparison hold of tropes just in case they hold of the bearers of the tropes with the addition of a specification of "respect."

3. Quantitative tropes and number tropes

3.1. Evidence for quantitative tropes

Tropes such as "John's happiness" and "Socrates' wisdom" are qualitative tropes. There are also quantitative tropes, and they play a rather important role in the semantics of natural language. In many cases, apparent abstract terms do not involve reference to abstract objects, such as numbers or degrees, but rather reference to quantitative tropes. Quantitative tropes include the referents of *John's height, Mary's weight*, *the degree of Mary's happiness, the extent of John's anger, the amount of John's wisdom, the quantity of liquid in the bottle*, as well as *the number of planets*. Quantitative tropes are still particulars, but they are more abstract in the sense of involving further "abstraction" from their bearers than qualitative tropes, and consequently forming greater similarity classes.

Apparent identity statements as in (22) and (23) at first sight seem to support the common view that the terms in question refer to abstract objects such as numbers or degrees:

(22) John's height is the same as Mary's.

(23) a. John's height is 2 meters.
b. Mary's weight is 50 kilos.
c. The number of planets is eight.

Moreover, at least some arithmetical operations appear to apply to the referents of those terms:

(24) a. John and Mary's weight together is more than 100 kilos.
b. Bill added Mary's height and Joe's height.

(25) a. John added the number of children to the number of adults.
b. John multiplied the number of guests by two.

The standard, Fregean view is that terms like *the number of planets* stand for numbers that are abstract objects, or *pure numbers*, as I will call them. Apparent support for that view is the applicability of arithmetical predicates and apparent identity statements like (22–23). For the same sorts of reasons, it is also a nearly standard view that NPs like *John's height* and *John's weight* refer to degrees, entities commonly identified with numbers.

Various criteria, however, show that such terms refer to tropes, entities that are concrete as long as they have a concrete bearer. This means that *the same as* in (22) should be understood as expressing qualitative not numerical identity and that the sentences in (23) are in fact not identity statements. Moreover, the arithmetical operations expressed in (24) and (25) need not be taken to be operations on abstract objects, but can be taken to be operations on quantitative tropes. In fact, we will see that they display restrictions that support the view that they operate on tropes, not abstract objects.

That terms like *the extent of Mary's anger* or *the number of planets* refer to tropes rather than purely abstract objects is not surprising semantically. It fits the generalization naturally that when an "abstract" relational noun is used with a definite complement or specifier, the resulting term will refer not to an abstract object, but rather to a trope. Other cases in point are *the form of the car, the relation between John and Mary, the color of the apple, the difference between John and Bill*, and *the shape of the object*.

There are two sorts of predicates in particular that make clear that the terms in question refer to quantitative tropes. First, predicates of perception and causation are applicable to them:

(26) a. John noticed the degree of Mary's happiness/the extent of Bill's anger/the amount of Bill's wisdom/the quantity of water in the bottle.
b. The number of women caused Mary consternation.
c. The weight of the stones caused the table to break.

Such predicates do not apply to the corresponding abstract objects, at least not with the same reading describing perception or causation:

(27) a. ?? John noticed the number fifty.
b. ??? The number fifty caused Mary consternation.
c. ??? Five kilos caused the table to break.

(27a) is possible only if *the number fifty* is to stand for an inscription or manifestation of a number.

Second, quantitative tropes and abstract objects show differences in the application of evaluative predicates. The predicates *high, low, significant*, and *negligible* naturally apply to quantitative tropes, situating them on a scale relative to a contextual standard, but they do not apply to the corresponding abstract degrees or numbers in that particular way:

(28) a. John's weight is low.
b. ??? 40 kilos is low.

(29) a. The number of deaths is high/low.
b. ??? The number ten is high/low.

(30) a. The number of animals is significant/negligible.
b. ? The number ten is significant/negligible.

(31) a. The number of women is unusual.
b. The number fifty is unusual.

Predicates of neutral comparison such as *exceed* also show the difference. *Exceed* can apply to quantitative tropes, but not to degrees or numbers in the way of a quantitative evaluation:

(32) a. John's weight exceeds Mary's weight.
b. ? 50 kilos exceeds 40 kilos.

(33) a. The number of women exceeds the number of men.
b. ?? The number fifty exceeds the number forty.

As with qualitative tropes, quantitative tropes appear to inherit relations of neutral comparison from their bearers. Thus, (34a) implies (34b), and (35a) implies (35b):

(34) a. John exceeds Mary in weight.
b. John's weight exceeds Mary's weight.

(35) a. The women exceed the men in number.
b. The number of women exceeds the number of men.

Another kind of evidence for quantitative tropes is the applicability of the plural. The plural is possible below even if the degrees involved are the same:

(36) a. The weights of John and Mary combined.
b. There were the same amounts of rain over the last few days.
c. Those various quantities of liquid are about the same.

Quantitative tropes are as particular as other tropes: they are dependent on a particular bearer and fulfill various conditions of concreteness as long as their bearer is concrete. Quantitative tropes are more abstract than other tropes, however, in the sense of involving abstraction from a greater range of features of their bearer than qualitative tropes. Consequently, they form larger similarity classes. Even if John's happiness is quite different from Mary's, if John is as happy as Mary, then "the extent of John's happiness" is the same as "the extent of Mary's happiness." Moreover, if Bill has as much wisdom as John, "the amount of John's wisdom" is the same as, but of a very different sort from, the amount of Bill's wisdom.

Again, *the same as* in these examples does not mean identity, but rather exact similarity. Identity *is*, which could only express numerical identity, would not be appropriate, that is, the sentences below could not possibly be true:

(37) a. ?? The extent of Mary's happiness is the extent of John's happiness.
b. ?? The amount of John's wisdom is the amount of Bill's wisdom.
c. ?? The number of women is the number of men.

However, the predicate *is identical with,* which, as I argued earlier, can express exact similarity, is appropriate:

(38) a. The extent of Mary's anger is identical to the extent of John's anger.
b. The number of women is identical to the number of men.

The semantics of quantitative tropes is closely linked to the semantics of comparison, as seen in the equivalence between (39a) and (39b) and between (40a) and (40b):

(39) a. The extent of John's happiness is the same as the extent of Mary's happiness.
b. John is as happy as Mary.

(40) a. The number of invited men was the same as the number of invited women.
b. As many men were invited as women.

In fact, the relation that the equative expresses is just the similarity relation that holds among quantitative tropes.

If *Mary's weight* and *the number of women* stand for quantitative tropes, the question is how to account for apparent identity statements like (23b) and (23c) repeated below:

(41) a. Mary's weight is 50 kilos.
b. The number of planets is eight.

There is evidence that such statements are in fact specificational sentences, with the subject specifying a question and the post-copular NP specifying an answer.[19] One common view about specificational sentences is that such sentences express question–answer pairs. The subject of a specificational sentence on such a view will be a "concealed question," an NP that looks like a referential term, but which in fact denotes a question.[20] Thus, the subject of (41a) will stand for the question "how much does Mary weigh?" and the subject of (41b) for the question "how many planets are there?" Given the question–answer analysis of specificational sentences, the post-copula expressions *50 kilos* in (41a) and *eight* in (41b) will not have to be referential terms. They simply specify an answer or part of an answer, and thus they may have the same non-referential function that they have when completing a sentence of the form *Mary weighs . . .* or *there are . . . planets*.

There is particular evidence from German for the view that apparent identity statements such as in (41a, b) are in fact specificational sentences. In German, an anaphoric pronoun taking a specificational subject as antecedent is obligatorily neutral and does require gender agreement, unlike an anaphoric pronoun taking an ordinary NP as antecedent. The constraint is illustrated by the contrast between the b-sentences and the c-sentences as continuations of the specificational sentences (42a) and (43a):

[19] See Higgins (1973) for the notion of a specificational sentence. See also Moltmann (forthcoming (b)) for a discussion of examples like (40a).

[20] See Schlenker (2003) and references therein for such a view of specificational sentences. Sharvit (1999) is representative for an alternative view according to which specificational sentences are identity statements involving possibly higher-order semantic values.

(42) a. Hans' Größe ist 2 meter.
"John's height (fem) is 2 meters."

b. ? Es ist nicht 1 meter 80.
it is not 1 meter 80.

c. ??? Sie ist nicht 1 meter 80.
she is not 1 meter 80.

(43) a. Die Zahl der Frauen ist neun.
"The number (fem) of women is nine."

b. Es sind nicht zehn.
it is not ten.

c. ??? Sie ist nicht zehn.
she is not ten.

If sentences like (41a, b) are specificational sentences, this will account for another potential problem for the number trope analysis of *the number of* terms, namely cases in which the relevant plurality would be empty:

(44) The number of students this year is zero.

If (44) is a specificational sentence, the subject simply specifies the question "How many students are there?" and the numeral in post-copular position gives the answer to the question.

3.2. The arithmetical behavior of number tropes

I had mentioned that arithmetical operations such as addition and subtraction can be viewed as operations on quantitative tropes, rather than operations on abstract objects such as pure numbers or degrees. To see how arithmetical operations can be understood that way, let us focus on number tropes, which display arithmetical properties particularly well. A number trope is a trope whose bearer is a plurality and which attends to just the numerical aspect of the plurality, namely just how many entities the plurality consists in. It disregards all its qualitative aspects. Number tropes have a plurality of individuals as bearers, that is, they have multiple bearers in the same role at once.[21]

The semantics of terms for number tropes of the sort *the number of women* will be as follows. *Number* in this context expresses a plural function mapping a plurality of

[21] Number trope terms display the usual evidence for the plural-reference view, as opposed to the reference-to-a-plurality view, namely the impossibility of replacing the plural NP by a singular count NP. Replacing the plural in (ia) by a singular collective NP as in (ib) results in unacceptability of the intended reading:

(i) a. the number of children
b. ?? the number of the set (sum/collection) of children

individuals to the trope that is the instantiation of the relevant number property in those individuals:[22]

(45) [*number*] = λxx λd[d = f(R, xx)] for a number property R such that R(xx).

Here "f" stands for the function mapping a property or a relation and an individual or several individuals to the instantiation of the property or relation in the individual or the individuals. The semantics of *the number of women* can then be given as follows, where $WOMEN_i$ is the restriction of the modalized plurality "women" to the circumstance i:

(46) [*the number of women*] = λi λd[d = f(R, ($WOMEN_i$)], for a number property R such that R($WOMEN_i$)

Number tropes do not have the full range of mathematical properties that pure numbers have. The restrictions on mathematical operations applicable to number tropes are in fact expected, given the way arithmetical operations and properties with number tropes must be understood. Mathematical operations inapplicable to number tropes include one-place operations such as the successor, predecessor, root, and exponent functions:

(47) ??? the successor/predecessor/root/exponent of the number of planets

By contrast, the two-place functors sum and *plus* are applicable to number tropes:

(48) a. the sum of the number of men and the number of women
b. The number of children plus the number of adults is more than a hundred.

What distinguishes the mathematical operations that are applicable to number tropes from those that are not? It appears that it simply depends on whether the mathematical properties or operations can be understood as properties of or operations on particular pluralities. The sum operation is applicable to two number tropes because it can be defined in terms of an operation on the two pluralities that are the bearers of the number tropes:

(49) Addition of Number Tropes
For two number tropes t and t', sum(t, t') = f(R, $d_1 \ldots d_n$) with R a number property and $\{d_1, \ldots, d_n\} = \{e_1, \ldots, e_m\} \cup \{e'_1, \ldots, e'_k\}$, where t = f($R_1$, $e_1 \ldots e_m$), t' = f(R_2, $e'_1 \ldots e'_k$) for number properties R_1 and R_2, provided $\{e_1, \ldots, e_m\} \cap \{e'_1, \ldots, e'_k\} = \emptyset$.

Here *f* is the function mapping a property and a plurality onto the trope that is the instantiation of the property in the plurality, and $d_1 \ldots d_n$ is the plurality consisting of $d_1, \ldots, d_n$.

Why is the successor function not applicable to number tropes? The reason is simply that the successor function cannot be considered an operation on concrete pluralities. The successor function as a function applying to a concrete plurality would require

[22] For the semantics of number trope terms, it is important to distinguish a relational noun *number* as it occurs in *the number of* terms from the homophonic non-relational noun as it occurs in explicit number-referring terms such as *the number eight*.

adding an entity to the plurality. However, given a "normal" universe, there is not just one single object that could be added. Rather there are many choices as to what object could be added to the plurality to yield its successor. Thus, uniqueness is not guaranteed, which means that as an operation on pluralities, the successor function just is not a function. Similar considerations rule out the predecessor, root, and exponent function as operations on number tropes.

In addition, some arithmetical predicates are applicable to number tropes as they are to pure numbers. Predicates such as *even, uneven, finite*, and *infinite* are possible both with numbers and with number tropes:

(50) a. The uneven/even number of guests puzzled Mary.
b. given the only finite number of possibilities
c. John pointed out the infinite number of possibilities.

There are other arithmetical predicates, however, that are not acceptable with number tropes. They include *natural, rational*, and *real*:

(51) ??? the natural/rational/real number of women

There is a sense in which pluralities can be even or uneven. Whether a plurality is even or uneven, depends on whether the plurality can be divided into two equal subpluralities. Similarly, whether a plurality is finite or infinite, simply depends on whether a 1–1 mapping can be established from the elements of the plurality onto themselves. A number trope will then be even, uneven, finite, or infinite simply because the plurality that is its bearer is. Thus, a mathematical predicate is applicable to one or more number tropes just in case its application conditions consist in hypothetical operations on the pluralities that are the bearers of the number tropes. The reason the predicates *natural, rational*, and *real* are inapplicable to number tropes appears to be that they already at the outset are defined for the domain of *all* numbers, rather than just the natural numbers. Number tropes thus are outside the domain of their application.

More generally, the following condition obtains for arithmetical operations on number tropes:

(52) Condition on Arithmetical Properties of and Operations on Number Tropes

a. If P is an n-place arithmetical property of number tropes, then for some n-place property of pluralities Q, for any number tropes $t_1, \ldots, t_n$: $P(t_1, \ldots, t_n)$ iff $Q(pp_1, \ldots, pp_n)$ for the bearers $pp_1, \ldots, pp_n$ of $t_1, \ldots, t_n$.
b. If f is an n-place function on number tropes, then for some n-place function on pluralities g, for any number tropes $t_1, \ldots, t_n$: $f(t_1, \ldots, t_n)$ iff $g(pp_1, \ldots, pp_n)$ for the bearers $pp_1, \ldots, pp_n$ of $t_1, \ldots, t_n$.[23]

[23] If the plurality is finite, there will be a unique number property, but not so if is infinite. However, an infinite plurality of which several number properties are true is arguably still the bearer of a unique number

Here pp_1, pp_2, . . . are used as plural variables standing for several objects at once (Yi 2005, 2006).

Subtraction as an operation on number tropes is subject to restrictions, indicated by the following contrast:

(53) a. John subtracted the number of children from the number of invited guests.
b. ?? John subtracted the number of planets from the number of invited guests.

Subtraction of a number trope *t* from a number trope *t'* as in (53a) is possible just in case the plurality that is the bearer of *t'* includes the plurality that is the bearer of *t*. If that is not the case, subtraction applied to number tropes is at least harder to get, as in (53b).

Division of one number trope by another is strange when it involves two number tropes, as in (54a); though it is acceptable when the second (but not the first) term is a numeral, as in (54b):

(54) a. ?? John divided the number of invited guests by the number of planets.
b. John divided the number of invited guests by two.

The reason for the acceptability of (54b) is that *divide by two* is a complex predicate that involves an arithmetical operation definable as an operation on a plurality.

Interestingly, multiplication with number tropes is available. Two particularly natural examples are those below:

(55) a. John doubled the number of invited guests.
b. Three times the number of children can fit into the bus.

Those examples, crucially, involve number tropes both as the point of departure and as the result of the multiplication. In (55a), John's act of "doubling" consists not just in a mathematical operation, but also in the replacement of one number trope (the number of invited guests at time *t*) by another (the number of invited guests at *t'*). In (55a), the doubling of the number trope may consist in adding as many names as there already are on the list of invited guests. (55b), moreover, does not just describe a mathematical operation of multiplication of the number of children by three, but rather compares the actual number of children to a hypothetical number trope whose bearer consists in a maximal number of children that fit into the bus. (55b), that is, compares the actual number of children to a hypothetical number trope with three times as many children as bearers.

The way number trope multiplication is expressed linguistically displays a particular way in which number trope multiplication is achieved. In the expression of number trope multiplication in (55b) the expression *times* is crucial. In (55b), *times* first applies to

trope: the number trope is just the numerical aspect of the plurality and there just is one such aspect, even if it can be described in different ways.

the number trope term *the number of children*; then the numeral *three* applies to *times the number of children*. The expression *times* in general appears to have the function of "generating" quantitative copies of tropes (or events), by mapping a trope (or event) *t* to copies of *t* that are quantitatively (or temporally) equivalent to *t*. More precisely, *times* maps a particular trope *t* to quantitative units of measurement of tropes for which *t* acts as the standard. This is also the case in (56), with a qualitative trope:

(56) John has three times the strength of Mary.

In (56), *times* maps a trope *t* that is the trope of Mary's strength to "concatenations" of quantitative copies of *t*. Given this, (56) means that John has a trope that "measures" three quantitative copies of Mary's strength.

Multiplication of tropes as expressed in natural language thus makes use of quantitative copies of tropes, namely either those that are obtained by a cognitive operation of copying a particular trope that serves as a standard, as in (56), or "copies" of number tropes, which are inherently quantitative. Number tropes require an additional operation of abstracting measuring units, quantitative copies of number tropes, in order to allow for multiplication.

4. Variable tropes and the notion of a variable object

Both qualitative and quantitative tropes may come in particular functional varieties. Such tropes, I will argue, involve the notion of a variable object, a notion I will make use of later in other contexts as well (especially in Chapter 5).

First, there are functional uses of trope-referring NPs, as in the sentences below:

(57) a. The beauty of the landscape has changed.
b. The intensity of the sound has increased.
c. The number of students has decreased.
d. The amount of corruption in this administration has become more noticeable.

The predicates make clear that such uses of NPs must refer to function-like entities, entities that manifest themselves as possibly different tropes at different times, that is, entities with variable trope manifestations. A given manifestation of such a functional entity at a time *t* is of course what the relevant NP refers to relative to *t*. Thus, the manifestation of "the beauty of the landscape" at a time *t* is simply "the beauty of the landscape at *t*." All the manifestations of "the beauty of the landscape" instantiate the same property and thus resemble each other to some extent.

By being able to be used to refer to entities with variable trope manifestations, trope-referring terms differ from fact- and state-referring terms. The latter do not have a variant referring to entities with variable manifestations:

(58) a. ??? The fact that the landscape is beautiful has changed.
b. ??? The landscape's being beautiful has changed.

Facts and states cannot change even if the grounds for the facts or states change. This is because whatever it may be in the world that is grounds for a fact or state obtaining, it is not something that will contribute to the individuation of the referent of the term. All that matters is that the fact- or state-defining conditions obtain whatever grounds for that there may be.

While there are no functional uses of state or fact descriptions, there are well-known functional uses of definite descriptions of individuals:

(59) a. The president of the US is elected every four years.
b. The temperature is rising.

Given the preceding section, *the temperature* in (59b) is in fact best taken to refer to a function-like object that has tropes as manifestations.

Ever since Montague (1973), it has become a standard view in formal semantics that *the president of the US* and *the temperature* in (59a,b) stand for individual concepts, functions mapping a world and a time onto an object meeting the description in the world at the time. This view is problematic, though. First, it gives rise to problems of substitution. It is not a function that "changes," "increases," or "is elected." In fact, the view that functionally used NPs stand for individual concepts does not mean that such NPs just stand for entities that are functions of some sort. Rather they are assigned a type different from the type of entities (namely type $<s, e>$, rather than type e). That is, functionally used NPs are simply not referential NPs referring to entities whatsoever. The type $<s, e>$ will also be the type of the argument position of predicates applying to the functionally used NP.

A further difficulty for the view that functionally used NPs stand for individual concepts is the fact that such NPs can describe the bearers of tropes:

(60) a. the constancy of the quality of Mary's work
b. the impact of the increasing pollution of the air

(60b) describes the causal relevance of what a functionally used NP stands for, which should be a trope with a concrete not an abstract object as bearer.

I will pursue the view that functionally used NPs refer to entities, that is, that they are of type e, rather than denoting individual concepts (of type $<s, e>$). They stand for function-like entities, but not for abstract objects that are functions. I will call the entities that functionally used NPs stand for *variable objects*. Variable objects may be regarded as a particular case of variable embodiments in the sense of Fine (1999).[24]

[24] Fine (personal communication) also meant to apply his theory of variable embodiments to functional NPs and NPs with intensional relative clauses, which I will discuss below.

Variable objects are entities that have different manifestations as different individuals or tropes in different circumstances, that is, at different times and in different worlds (or situations). A variable object *o* thus is associated with a function *manif* mapping circumstances to entities in those circumstances that are the manifestations of *o* in those circumstances.

Largely, the properties of variable objects are obtained from properties of their manifestations. Thus, variable objects obtain time- or world-relative properties (including properties of time- or world-relative existence) from their manifestation, as follows:

(61) a. A variable object *o* exists in a circumstance *i* iff manif(*o, i*) exists.
b. A variable object has a circumstance-relative property *P* if manif(*o*, *i*) has *P* in *i*.

Variable objects may also have circumstance-relative properties that involve a set of circumstances. These would be properties expressed by predicates like *change* or *remain constant*. Moreover, variable objects may have circumstance-independent properties. For example, the variable object that is "the president of the US" has the property of having important responsibilities.

Given the ways in which variable objects come to have properties, they may of course themselves act as bearers of tropes. For example, variable objects may be the bearers of tropes which instantiate properties that depend on a set of circumstances, as below:

(62) a. the increase of the temperature
b. the constancy of the number of students

A phenomenon related to tropes with bearers described by functionally used NPs are apparent trope-referring terms with NPs modified by intensional relative clauses:

(63) a. the originality of the book John wants to write
b. the simplicity of the dress Mary needs for the occasion

The NPs in (63) appear to refer to qualitative tropes. The same sorts of NPs below appear to refer to quantitative tropes:

(64) a. the number of people that fit into the car
b. the number of books John has to write
c. the number of screws that are missing

(65) a. the length of the book John needs to write
b. the height of the house John tries to build
c. the length of the time John might be away

The various criteria for trope reference introduced earlier show that such NPs do in fact involve reference to tropes. First, predicates of perception and causation can apply to at least some of those NPs:

(66) a. Mary noticed the number of screws that were missing.
b. The number of screws that were missing caused the door to fall off.

Furthermore, predicates of similarity and numerical identity apply just as they do with ordinary trope-referring terms:

(67) a. The number of women is the same as the number of men.
b. ?? The number of women is the number of men.

(68) a. The number of books Mary wants to write is the same as the number of books Sue wants to write
b. ?? The number of books Mary wants to write is the number of books Sue wants to write.

Finally, predicates of neutral comparison apply with the NPs in question just as they do with ordinary trope-referring terms:

(69) a. The height of the desk John needs exceeds by far the height of the desk John is using right now.
b. The elegance of the dress that the bridesmaid needs should not exceed the elegance of the dress that the bride will wear.

(70) a. The number of people that fit into the bus exceeds the number of people that fit into the car.
b. The people that fit into the bus exceed the people that fit into the car in number.

In addition, one-place predicates of quantitative evaluation are applicable to intensional *the number of* terms:

(71) a. The number of people that fit into the bus is high.
b. The number of screws that are missing is negligible.
c. The quality of the paper John needs to write must be high.

Thus, apparent trope-referring terms with intensional relative clauses refer to potential objects of perception and causal relations, and they behave just the same with respect to predicates of similarity, identity, and neutral comparison as ordinary trope-referring terms.[25] Yet they generally do not stand for single tropes with a variable object as bearer. This is because such NPs require a modal in the main clause. For example, unlike (72a), (72b), without the modal, is not acceptable:

[25] Note that apparent trope-referring terms with intensional relative clauses also allow for functional uses:

(i) a. The number of books John wants to write is constantly changing.
b. The number of books that we need is increasing every day.
c. The number of screws that are missing becomes more and more noticeable.

(72) a. The impact of the book John needs to write must/might exceed the impact of the book he has already written.
b. The impact of the book John needs to write exceeds the impact of the book he has already written.

Rather than referring to a single trope with a variable object as bearer, NPs of the sort in (63) to (65) generally refer to variable tropes, more precisely variable tropes whose variability is "driven by" the variability of the bearer. That is, they refer to variable tropes whose manifestation in a circumstance *i* is a trope of the manifestation in *i* of the variable object that is the apparent bearer. For example, "the impact of the book John needs to write" is the variable trope whose manifestation in a circumstance *i* is the impact of the book John has written in *i* (if *i* is a circumstance in which John's needs are satisfied). Thus, in (72a), the meaning of *impact* will be the function below:

(73) For a variable object *o*,
impact(*o*) = the variable object t such that for any circumstance i, manif(*t*, *i*) = impact(manif(*o*, *i*)) if impact(manif(*o*, *i*)) is defined.

I will come back to NPs with intensional relative clauses in Chapter 5 when discussing transitive intensional verbs.

The notion of a variable object permits not only avoiding reference to abstract objects (individual concepts), but also allows for an appropriate account of the sorts of properties that the referents of functionally used NPs and NPs with intensional relative clauses can bear.

5. Tropes and the semantics of adjectives

So far, we have focused on adjectival nominalizations and the kinds of tropes they may refer to. The role of tropes in the semantics of adjective nominalizations raises a number of related semantic questions such as the following. What is the semantic status of tropes in an ordinary subject–predicate sentence? How do adjective nominalizations get their referent? Most importantly, what is the role of tropes in the meaning of adjectives in general?

Tropes clearly play a semantic role in sentences besides that of being referents of nominalizations. In particular, they are the entities that modifiers of adjectives apply to. Even though it is a common view that adjective modifiers are predicates of an implicit degree argument of adjectives, many sorts of adjective modifiers cannot just be predicates of degrees as abstract objects. Rather, the range of adjective modifiers there are reflects the range of properties that tropes should have. Thus, the following types of adjective modifiers are most naturally considered predicates of tropes and can hardly be considered predicates of degrees:

[1] Modifiers referring to the particular way a property is manifested:

(74) a. exquisitely/strangely beautiful
b. intensely/uniformly/profoundly red

Clearly, degrees cannot be exquisite, strange, intense, uniform, or profound. However, tropes, the particular manifestations of properties in objects, naturally can.

[2] Modifiers referring to the perceivability of a property manifestation:

(75) visibly/perceivably happy

Degrees as abstract objects are not perceivable, but tropes, as concrete objects, certainly are.

[3] Modifiers referring to the causal (including emotional) effect of the property manifestation:

(76) a. fatally weak
b. exhaustingly long

Degrees as abstract objects, on most philosophers' views, are not possible relata of causal relations, but tropes are (for philosophers that accept them).

[4] Modifiers referring to the role of the property manifestation as an object of intention:

(77) deliberately silent

Tropes, just like events, naturally act as the target of actions, but not abstract objects like degrees.

[5] Evaluative predicates that concern the extent to which an entity manifests a property:

(78) a. John is remarkably tall.
b. The remark was shockingly inadequate.
c. The baby is surprisingly ugly.

Such modifiers are understood in just the way they are understood with adjective nominalizations. Thus, (78a) is understood as "John's height is remarkable," (78b) as "the inadequacy of the remark is shocking," and (78c) as "the ugliness of the baby is surprising."

Given that the range of adjective modifiers naturally corresponds to the range of properties of tropes, the question is, how are tropes available as entities for those predicates to apply to, that is, what is the semantic status of tropes in a sentence? There are two options:

[1] Tropes are implicit arguments of adjectives.
[2] Tropes are truthmakers of the combination adjective–referential term.

The truthmaking idea is a rather novel concept to explore for the semantic analysis of natural language. I will address this option in the appendix to this chapter, where I will give arguments in favor of an implicit-argument approach.

The view that tropes are implicit arguments of predicates fits well with the trope-nominalist view of properties as sets of tropes. If properties are sets of tropes, then it may be expected that predicates denote such sets, rather than sets of individuals. A sentence such as *John is happy*, even if it is not about a trope of happiness (because it does not contain a referential term referring to one), attributes a trope of happiness to John. I will not take adjectives to denote sets of tropes, though, but relations with one argument position reserved for tropes. Some adjectives take several arguments (e.g. *proud of, related to*), with both the subject and the complement providing entities relating to the trope in particular roles. Thus, *happy* will denote a two-place relation between tropes and objects, and *proud* a three-place relation between tropes, objects (subjects of the mental state), and objects (the object the mental state is directed toward).

If tropes are implicit arguments of adjectives, then adjectival modification and adverbial modification will be semantically represented as in (79a) and (79b) respectively:

(79) a. [*deeply red*] = λxt[deep(t) & red(t, x)]
b. [*the rose is deeply red*] = $\exists$t(red(t, [*the rose*]) & deeply(t))

This will be parallel to the Davidsonian account of adverbial modifiers as predicates of implicit event arguments of verbs, the account on which (80a) has the logical form in (80b):

(80) a. John walked quickly.
b. $\exists$e(walk(e, John) & quickly(e))

Just as events on the Davidsonian view act as implicit arguments of verbs, tropes would act as implicit arguments of adjectives. This will also allow for a unified account of trope and event nominalizations. Event nominalizations involve picking up the implicit event argument of the verb and adjective nominalizations the implicit trope argument of the adjective:

(81) a. [*John's quick walk*] = ιe[walk(e, John) & quick(e)]
b. [*the rose's deep redness*] = ιt[red(t, [*the rose*]) & deep(t)]

In both cases, adjectival modifiers will be predicated of the event or trope referent.

Not all adjectival modifiers can be viewed as predicates of particular tropes, though. Adjectival modifiers like *completely, partially*, and *very* cannot be considered predicates of particular tropes, but are to be considered predicates that apply to trope types and involve reference to a scale of trope types (cf. Moltmann 2009). Moreover, not all the trope arguments are of the same sort and thus may impose particular restrictions on what adjectival modifiers are possible, as we will see.

6. Challenges to standard trope theory: the gradability of adjectives

So far, the view was that an adjective denotes a set of tropes or rather a relation between individuals and tropes, the instances of the qualitative property expressed by the adjective. This view, however, disregards one fundamental feature of adjectives and that is their gradability. Gradable adjectives characteristically allow for the comparative and a range of "degree modifiers" such as *highly, intensely*, or *slightly*. It is part of the content of an adjective like *tall* not only to be able to specify that an entity has a height, that is, is a bearer of a height trope, but also that an entity is tall (that is, is taller than a contextual standard), very tall, somewhat tall, or taller than another.

The gradability of adjectives is related to the fact that in general a gradable adjective goes along with two kinds of nominalizations:

[1] Nominalizations that correspond to the comparative content of an adjective such as *weight* or *height*
[2] Nominalizations that correspond to the positive form of the adjective such as *heaviness* or *tallness*

Neither type of nominalization can refer to simple tropes in the sense of instances of one-place properties. Rather they both have to refer to more complex tropes based on an ordering among tropes. In what follows, I will present several arguments that show that gradable adjectives fundamentally express comparative concepts involving tropes. That is, the adjectives themselves impose an ordering among tropes.

6.1. Gradable adjectives

Given the trope-based approach to the semantics of adjective nominalizations, nominalizations of gradable adjectives pose a particular problem, which I will call the *problem of direction*. This is the problem of how we can tell, given two tropes of the same type, such as Sue's strength and Mary's strength, which one is "greater than" the other, that is, to use the degree locution, which one represents a greater degree of strength than the other does. At first, the answer to the question may seem entirely straightforward: we just need to test Sue's strength and Mary's strength, that is, examine those two tropes, to see which one is "greater than" the other. However, this is in fact problematic, as can be seen when switching to the corresponding nominal-

izations of the negative adjective, that is, *Sue's weakness* and *Mary's weakness*. When we refer to two tropes as "Mary's weakness" and "Sue's weakness," it is also intuitively clear what needs to be the case for one to exceed the other. However, the exceed-relation among weaknesses is the inverse of the exceed-relation among strengths: the extent of the weakness of a person "increases" the weaker the person is. Suppose that in a given context Mary's strength (supposing that it is "negligible") is identical to Mary's weakness. Polar adjectives like *weak* and *strong* clearly are applied to an individual on the same physical basis (the relevant physical condition) and thus on the basis of one and the same trope. This means that in this context there will be one and the same trope *t* that is the referent both of *Mary's weakness* and of *Mary's strength*. But then, if we compare *t* to a similar trope that we could refer to either as "Sue's weakness" or as "Sue's strength," the following invalid inference results:

(82) Mary's weakness exceeds Sue's weakness.
Sue's strength exceeds Mary's strength.
Sue's strength = Sue's weakness.
Mary's weakness = Mary's strength.
Sue's weakness exceeds Sue's weakness.

The problem is not limited to the predicate *exceed*, but arises in the same way for adjectives of quantitative evaluation. We know (roughly) what needs to be the case so that John's strength is great and Mary's strength is negligible, and if that is in fact the case (speaking of the same type of physical strength), then John's strength exceeds Mary's strength. Conversely, if John's weakness is great and Mary's weakness is negligible, then John's weakness exceeds Mary's weakness:

(83) a. John's strength is great.
Mary's strength is negligible.
John's strength exceeds Mary's strength.

b. John's weakness is great.
Mary's weakness is negligible.
John's weakness exceeds Mary's weakness.

The same reversal among the ordering of tropes can be observed with the nominalizations of any pair of polar adjectives (*darkness–lightness, equality–inequality, experience–inexperience*).[26]

[26] Nominalizations of gradable adjectives raise furthermore what I call the *single-respect problem*, as I argued in Moltmann (2009). This problem is illustrated below with the predicate *exceed*:

(i) John's happiness exceeds Mary's happiness.

The problem is why should (i) not have a reading on which John's happiness lasted longer (though was less intense) than Mary's or on which John is bigger than Mary. Such readings are entirely excluded. Only the qualitative respect and not any spatio-temporal features are available for quantitative comparison of tropes. Readings relating to the spatial extension of tropes may be ruled out simply because tropes do not bear a direct relation to space (Section 2.4.).

The problem of direction is a serious one for the standard view of tropes applied to adjective nominalizations. It shows that nominalizations of gradable adjectives cannot just refer to tropes in a standard sense, namely physical conditions underlying someone's weakness or strength. Rather they must refer to standard tropes qua ordered in a certain way with respect to other physical conditions of the same sort.

Obviously, the nominalization of an adjective restricts tropes to one dimension of comparison: the extent to which the property is instantiated. Moreover, it gives a direction of comparison: it orders tropes with respect to the extent to which they instantiate the property in question. Thus, nominalizations of gradable adjectives refer to complex entities that incorporate the way the trope is ordered with respect to tropes of the same sort. However, what sort of entity should that be?

A first option that comes to mind is that such nominalizations refer to relational tropes, or better, a sum of relational tropes: the sum of all the instances of the "greater-than" relation involving the relevant standard trope. However, this is implausible: there is no reason to expect the exceed-relation or measure adverbs to apply to such a sum in the way they do. Moreover, John's strength is only John's; it is not a relation, or a sum of relations between John and other people. To avoid the latter problem one may take the referent of a gradable adjective nominalization to be a quasi-relational trope, or a sum of quasi-relational tropes, namely instances of properties of being greater than or smaller than a trope *t*, for any trope *t* of the same sort as the trope in question. However, this option still has difficulties accounting for the applicability of the greater-than relation and measure predicates. How can the instantiation of various greater-than or smaller-than properties exceed another instance of that sort and be great or negligible?

What is needed is maintaining the standard trope as referent, but as something that is ordered with respect to other tropes of the same sort. Such a referent may be conceived as a composition of some sort of the standard trope and the various relational tropes involving the standard trope. This composition must be such that its properties are that of the standard trope, but "guided" by the relational tropes. The kind of object this corresponds to most closely is that of a qua object in roughly the sense of Fine (1982a). That is, gradable adjective nominalizations denote a qua trope, a standard trope t qua bearing the various instances of properties "being greater than t'" or "being less than t'" for the various tropes t' of the same sort as *t*. That is, they denote an entity of the sort "*t* qua $t < t'$, $t < t''$, $t < t'''$, $t^{\star} < t$, $t^{\star\star} < t$, . . . " for the various tropes t', t'', t''' $t^{\star}$, $t^{\star\star}$, . . . of the same sort as *t*. This corresponds naturally to what we find with *as*-phrases modifying NPs, which trigger the same readings of the relevant predicates:

(85) a. John as a gymnast exceeds everyone in his class.
b. John as a gymnast is great.
c. John as a financial contributor is negligible.

The properties of being a gymnast and being a financial contributor trigger a single reading of the predicates *exceeds, is great*, and *is negligible* in (85).

Using the notion of a qua trope (following Fine's notion of a qua object) may not be the only option for accounting for such *order-constituted tropes* (as I will call them). Whatever account of order-constituted tropes is chosen, what matters is that the referent be composed in some way of the standard trope and the various relational tropes, under the condition that the result bear just those properties induced by the relational tropes. Thus, it will take the form in (86), for some operation of composition c:

(86) [*John's strength*] = $\lambda i\, \iota x[x = c(\max t[\text{strong}_i(t, \text{John})), \lambda r[\exists i'\, \exists t'\, \exists d(\text{strong}_{i'}(t', d) \,\&\, r = f(\leq, t, t') \vee r = f(\leq, t', t))])]$

Where does the ordering (one trope exceeding another, a trope being great, another being negligible) come from, if it cannot have its source in the nature of the tropes, as traditionally conceived? The answer can only be that the ordering is imposed by, and thus part of, the concept that is expressed by the adjective in question. As Engel (1989) has emphasized, extensions and intensions do not suffice for making up the properties that adjectives express, rather it is the "degree structure" that is constitutive of those properties as well. For example, the properties being between *m* and *n* meters tall and being tall, apart from the one property being vague and the other not, may, in a given context, have the same intension and extension; but whereas the former will involve no ordering (according to degrees), the latter will. Being able to learn and use the concept expressed by a gradable adjective means not only knowing under what circumstances the concept is true of an object, but also knowing under what circumstances one entity, as an instance of the concept, exceeds another instance of the concept.

Thus gradable adjectives will not just describe a set of tropes or rather a function from indices to sets of tropes, but rather an ordering among tropes, or rather a function from indices to ordered sets of tropes. This ordering is both what predicates like *greater than* or *exceed* with nominalizations make reference to and what is expressed by the comparative itself. I will call the function from indices to ordered sets of tropes the *comparative concept* expressed by the adjectives. The comparative concept obviously is closely related to the meaning of the adjective in the comparative form. However, it also underlies the meaning of adjectives in the positive form and the meaning of nominalizations.

There are reasons to have the ordering involved in the comparative concept not only relate tropes in the same world at the same time to each other, but also tropes across different worlds and across different times. This is needed for well-known examples like these:

(87) a. I thought your yacht was longer than it is.
b. If your yacht was longer than it is, I would be envious.
c. The cat is bigger now than it was a year ago.

The trope-based analysis will account for such sentences once possible tropes are admitted and tropes from different worlds and times are taken to be ordered with respect to each other.

The comparative concept of an adjective can be characterized as follows:

(88) The *comparative concept* f(A) of an adjective A is a function from indices to sets of tropes such that $(\cup\{T \mid \exists i \in I\ f(A)(i) = T\}, \leq_A)$ is a transitive and reflexive ordering.

The role of the comparative concept of adjectives is apparent also when contrasting adjective nominalizations with other trope-describing nouns, such as *form*. Whereas (89a) is acceptable, with an adjective nominalization, (89b) and (89c), with trope-describing underived nouns, are not:

(89) a. The straightness of the first rope is greater than the straightness of the second rope.
b. ??? The form of the first rope is greater than the form of the second rope.
c. ?? That feature of the first rope is greater than/exceeds the one of the other rope.

Even though *the straightness of the rope* and *the form/feature of the rope* should refer to the same configurational trope, the "greater than" relation is applicable only to the former, not to the latter. The reason is clear: *straightness* is derived from an adjective whose meaning is based on a comparative relation among tropes. By contrast, nouns such as *form* or *feature* do not involve any comparative relation among tropes.

6.2. Positive and absolute nominalizations

A second challenge for the standard view of tropes comes from two kinds of nominalizations of adjectives or verbs that generally allow for degree phrases. The first kind is exemplified by the examples in (90a, 91a), the second by the examples in (90b, 91b):

(90) a. the stone's heaviness—the stone's lightness
b. the stone's weight

(91) a. the building's tallness—the building's smallness
b. the building's height

Both nominalizations clearly refer to tropes, possible objects of perception and possible arguments of causal relations:

(92) a. John noticed the building's tallness/the building's height.
b. John's weight/heaviness caused the bed to fall apart.

This is despite the standard view that *the building's height* and *John's weight* refer to degrees.

However, the two kinds of nominalizations differ semantically. The semantic inference manifests itself in that the inference to the positive of the adjective is possible in (93a) and (94a), but not in (93b), (93c), (94b), and (94c):

(93) a. John's tallness exists. → John is tall.
b. John's height exists. → John is tall.
c. John's smallness exists. → John is small.

(94) a. John's heaviness exists. → John is heavy.
b. John's lightness exists. → John is light.
c. John's weight exists. → John is heavy.

According to a common analysis, *tall* in *John is tall* expresses a relation that holds between an individual and a contextual standard. This suggests that John's tallness is in fact the instantiation of the "is greater than" relation in John and the contextual standard, that is, a relational trope with an abstract object (a contextual standard) as its second argument. But in fact, "John's tallness" cannot be a relational trope. Relational tropes that obtain between simple tropes and a standard should have properties that relate to both the simple trope and the standard. This means, for example, that a relational trope is concrete just in case its bearer is concrete. A standard, being a type, is not concrete, and thus the relational trope should not be either. However, the referent of a positive nominalization such as *John's tallness* classifies as a concrete object, being able to be observed and have causal effects.

An alternative would be that "John's tallness" is a qua trope, "John's height qua exceeding the contextual standard." The problem, however, is that unlike "John's height," "John's tallness" resists degree predicates, as in (95), as well as predicates of change, as in (96), and it triggers a different reading of evaluative predicates than does "John's height," as in (97):

(95) a. ??? John's tallness is 2 meters.
b. John's height is 2 meters.

(96) a. ?? John's tallness has changed.
b. John's height has changed.

(97) a. John's tallness is unusual.
b. John's height is unusual.

By contrast, the qua trope that is "John's height qua exceeding the standard" allows for degree phrases, predicates of change, as well as the relevant readings of evaluative predicates:

(98) a. ? John's height as something above standard is two meters.
b. ? John's height as something above standard has changed.
c. John's height as something above standard is unusual.

A better alternative therefore is to take "John's tallness" to be a quasi-relational trope, namely the instantiation of the property of exceeding the contextual standard in John's height.

Quasi-relational tropes will also be the tropes described by adjectives when they do not take degree phrases as modifiers, as in (99a) and (99b):

(99) a. John is unusually tall.
b. John is noticeably tall.

By contrast, with a degree phrase, the trope argument of the adjective will be the simple trope, allowing for a degree modifier, which will act as a predicate of the simple trope:

(100) John is 1 meter tall.

To summarize, the tropes that are described by adjectives and their nominalizations may be considerably more complex than standard trope theory would have it.

7. Tropes and events

7.1. Semantic parallels between tropes and events

If tropes are considered implicit arguments of adjectives, they will play the same semantic roles in relation to adjectives as events play in relation to verbs, within Davidsonian event semantics. Tropes obviously are closely related to events also ontologically. In fact, some philosophers do not hesitate to include events among the category of tropes or else tropes among the category of events. The original interests in tropes and events were quite different, though. The main interest in tropes in contemporary metaphysics is the aim of reducing properties and sometimes individuals to them, conceiving of universals as classes of similar tropes and of individuals as bundles of co-located tropes. Events have received the attention of philosophers for very different reasons, such as the interest in causation, adverbial modification, and time.

There are a range of ontological similarities between events and tropes. Both events and tropes are particulars as opposed to universals. Both generally depend on other objects, their participants. Note that events just like tropes may lack a unique bearer, under the same circumstances. Thus, the sharpening of the knife could not possibly be a distinct event from the sharpening of the blade of the knife, and the dyeing of the sweater could not possibly be a distinct event from the dyeing of the wool of the sweater. Furthermore, both events and tropes may act as relata of causal relations, and are perceivable, unlike facts:

(101) a. John watched Mary's walk home.
b. ?? John watched the fact that Mary walked home.

Finally, events have an internal structure and are fully specific. Thus, predicates requiring internal structure of an argument such as *describe* distinguish between events and facts in just the way as they had distinguished between tropes and facts:

(102) a. John described Mary's walk home.
b. ?? John described the fact that Mary walked home.

(103) a. John compared Mary's walk to Bill's walk.
b. ? John compared the fact that Mary walked home to the fact that Bill walked home.

Like tropes, events are "grounded" and have an internal structure that generally goes "below" the event description, unlike facts, which lack an internal structure in the relevant sense.

7.2. Tropes as an ontological category comprising events

The ontological similarities between events and tropes suggest a conception of events in terms of tropes. There are three options of conceiving events in terms of tropes, one of which I will in the end adopt.

First, events might be conceived as tropes instantiating a dynamic property, that is, a conjunction of tensed properties. A very simple example of an event so conceived would be "the property of being *P* at *t* and *Q* at *t*'", for subsequent times *t* and *t*' and contrary properties *P* and *Q*. To see whether this is an adequate account requires looking at the semantic behavior of true event terms and potential terms for tropes instantiating dynamic properties. *John's loss of happiness* and *John's becoming unhappy* are true event terms, whereas a complex term like *John's happiness and subsequent unhappiness* may be a candidate of a term describing a trope instantiating a dynamic property. We then observe that some predicates such as *was sudden* or *was unexpected* are applicable to events, but not to tropes instantiating a dynamic property:

(104) a. John's loss of happiness was sudden/was unexpected.
b. ??? John's happiness and subsequent unhappiness was sudden/was unexpected.

This means that events cannot be tropes instantiating a dynamic property.

A second option would be to take events to be collections of tensed tropes such as, in a simple case, the collection of two tropes with the same bearer, one instantiating "being *P* at *t*" and one instantiating "being *Q* at *t*" for contrary properties *P* and *Q* and subsequent times *t* and *t*'. The problem with this conception is that there are collective predicates that may be true of collections of tropes such as "John's happiness and his subsequent unhappiness," but not of events, as seen below:

(105) a. John's happiness and his subsequent unhappiness were equally surprising/resembled each other/lasted the same number of years.
b. ??? John's loss of happiness was equally surprising/resembled each other/lasted the same number of years.

A third option is to conceive of events as temporal transitions among tropes. On such a view, proposed by Mertz (1996), events would be relational tropes, instantiations of temporal or causal relations in two or more tropes. Thus, John's becoming unhappy would be the transition from John's happiness to John's unhappiness, and John's killing of Bill, roughly, the causation of Bill's being dead by John's act. This will account adequately for the applicability of typical event predicates such as *was sudden* or *was unexpected* and the inapplicability of plural predicates:

(106) a. The transition from John's happiness to John's unhappiness was sudden/was surprising.
b. ??? The transition from John's happiness to John's unhappiness were equally surprising/resembled each other/lasted the same number of years.

If events are instantiations of temporal transition relations, then their location in time will be essential to them.

However, there is still a problem with this conception of events and that concerns similarity relations. Tropes count as exactly similar (as "the same") in case they instantiate the very same (natural) property. However, if events are transitions among tropes, then there will be events that come out as exactly similar that should not. If events are instances of the general immediate temporal precedence relation, then events will be exactly similar just because they instantiate that relation, which is obviously wrong. Even if temporal precedence were to be specific to particular times, still simultaneous events that involve very different kinds of tropes may come out as exactly similar.[27]

What is required for the similarity of two events is that the tropes involved be similar too. The only things that need not be "the same" are the times at which the events take place. Recall that the time at which an event takes place is essential to it. The fourth option of conceiving events in terms of tropes then is this: events are relational tropes consisting in the instantiation in times of temporal transition relations involving lower-level tropes. That is, time intervals would be the bearers of the higher-level tropes with which events are identified. Let us take the very simple case of an event that consists in the transition from $P(a)$ to $Q(a)$ for some individual a and contrary properties P and Q. This event can now be conceived as the instantiation in times t and t' of the relation $\lambda t\, t'[P^{t}(a) \,\&\, t < t' \,\&\, Q^{t'}(a)]$, that is, the relation that holds of times t and t' if P holds of a at t and Q holds of a at t' and t (immediately) precedes t'. Thus, for any two events to be exactly similar the properties and individuals involved need to be the

[27] One might argue that temporal precedence is too "thin" a relation (in the sense of not allowing for different ways of instantiation) and that second-level tropes that are instances of such a relation require the similarity of the lower-level tropes as well. But this does not seem correct. The relations of being distinct and of being equivalent are equally "thin." But the distinctness of John's ability and Mary's ability may be "the same as" the distinctness of some entities x and y, whether or not x and y are similar to John's ability and Mary's ability (for example John's ability and Mary's ability are as distinct as John's head and Mary's head). "The same as" is perhaps not very felicitous in such a case, but it would not improve if x and y were chosen differently.

same and the times need to stand in a relation of immediate precedence. However, the times at which the properties hold of the individuals need not be the same. Given this, the time of occurrence will be essential to an event (since a trope ontologically depends on its bearer).

Setting the ontological and semantic similarities between events and tropes aside, there is one major difference between verbs as event predicates and adjectives as trope predicates. Events do not exhibit the same evidence for a lexically imposed ordering as tropes, that is, there is no reason to assume that eventive verbs denote ordered sets of events. Verbs as event predicates behave like nouns in that respect rather than gradable adjectives. I mention just two manifestations of that difference. First, the verb *exceed* has several readings with event nominalizations and not just the single "degree" reading that it has with adjective nominalizations:

(107) a. John's happiness exceeded John's sadness.
b. John's laughter exceeded John's crying.

Whereas (107a) can only mean that the "degree" to which John is happy exceeds the degree to which he is sad, the exceed-relation expressed in (107b) can compare John's laughter and John's crying in various respects; in intensity, length of time, or frequency of occurrence. Furthermore, there are much weaker restrictions on the commensurability of adverbial comparatives. Events of different types can much more easily be compared than tropes:

(108) a. John has laughed more than he has cried.
b. ?? John is happier than he is sad.

The difference between events and tropes must be traced to a fundamental difference between verbs and gradable adjectives. Gradable adjectives express an ordering among tropes, and nominalizations of gradable adjectives refer to complex tropes that include the ordering relative to other tropes. Verbs will not impose an ordering among events, that is, among transition tropes. Events are second-order relational tropes in which two or more first-order tropes instantiate a relation of temporal transition. Events can be compared in extent only in other respects, for example by comparing the tropes involved in them or their subevents, or by comparing their temporal duration.

There is a debate as to whether stative verbs should also be assigned an implicit argument position for states. Some semanticists argue that stative verbs should not contain such an argument position (Katz 2003). Others argue that they should, though the state arguments, for the most part, would be "abstract states" or "Kimian states," as Maienborn calls them, that is, entities, more on a par with facts than events (Maienborn 2007, Moltmann forthcoming (c)). I will not enter the debate in the present context. However, in the next section I will sketch an ontological account of states that would give justice to implicit state arguments being "abstract" or Kimian states.

8. Sketch of an ontological account of facts and states

We have seen that tropes and events are sharply distinguished from facts (and states), and in more ways than usually thought. One important difference we have seen is that whereas facts (and states) may be constituted by determinable, non-specific, or quantificational properties, tropes and events must be grounded in instances of fully specific properties. This way of describing the difference between tropes and events on the one hand and facts and states on the other hand does not yet tell what the true ontological difference resides in. The way a trope or event is grounded in instances of fully specific properties could in principle be fully described by an explicit fact description, but such a fact description will still refer to a fact, not a trope or an event, whatever complexity it may have.[28]

This difference is obviously linked to the fact that the nature of facts and states is intimately connected to the content of an explicit fact or state description, whereas tropes and events are independent of the content of any possible trope or event description. Tropes and events are generally much more specific than the description used to refer to them. At the same time, facts and states cannot depend for their existence on a particular sentence. The relevant facts and states will exist even if there were no sentences describing them.

There are two approaches in the philosophical literature to such entities, that is, entities "driven by" the semantic content of (non-referential) expressions, but at the same time not existentially dependent on them. One such approach makes use of abstraction in the sense of Frege's conception of numbers. On that approach, numbers are introduced (or implicitly defined) as the referents of *the number of* terms, by Hume's principle:

(109) The number of F = the number of G iff there is a one-to-one mapping between the *Fs* and the *Gs*.

(109) gives the identity conditions of numbers as independent of the particular choice of concepts F and G. (109) leaves some significant and greatly discussed questions open, notably the question about the identity of a number with an object not obtainable by applying *the number of* function to a concept.

[28] One philosopher who has made a proposal concerning the distinction between the two sorts of entities is Steward (1997). Steward (1997) proposed that the distinguishing feature of events and states is that events may have a description that the relevant agent may not be aware of (the "Secret Life Requirement"), whereas states have a canonical description constituting them. This account applies just as well to the distinction between tropes and facts. The problem with Steward's account is that it makes the difference between the two sorts of entities an epistemological, not an ontological, one: events and states are distinct even in case there are no agents that could be aware of any description. Steward's account also fails to capture various other differences between events (and tropes) and states (and facts), such as that the former may have an internal structure, an extent, as well as parts, but the latter not. The account would, moreover, not capture the fact that events and tropes may be located in space and time, but facts may not (setting the temporal duration of states apart). The difference between events and tropes on the one hand and facts and states on the other hand can only reside in a more fundamental ontological difference.

A second approach is the theory of *pleonastic entities* of Schiffer (1996). Pleonastic entities, roughly, are entities whose properties can be read off true sentences in which the corresponding (non-referential expression occurs, by what Schiffer calls "something-from-nothing transformations." A simple example is the truth property ascribed to propositions. Truth can be ascribed to a proposition as in (110a) because (110a) is an inference from (110b):

(110) a. The proposition that S is true.
b. That S is true.

Let us see how such an account might apply to facts. First, epistemic and other propositional attitudes, it appears, can be ascribed to facts on the basis of inferences such as from (111b) to (111a):

(111) a. John recognized/regrets the fact that S.
b. John recognized/regrets that S.

Here I assume (and I will discuss the view in great detail in Chapter 6) that *that*-clauses do not as such stand for propositions or proposition-like objects such as facts. Obviously, not every attitude report with a simple *that*-clause can be the basis of an attribution of a property to a fact, for example not one with the verb *believe*. Only attitude verbs can that presuppose the truth of the *that*-clause, and even then, there are restrictions (*John knows the fact that* S is not as acceptable as expected). The account, however, would simply say that for those cases in which an attitude report involves an explicit fact description there is a corresponding sentence not making use of that description.[29]

Also the attribution of relations of causal explanation may be based on sentences not making use of explicit fact descriptions, as indicated by the possibility of inferring (112a) from (112b):

(112) a. The fact that S explains that S'.
b. S' because S.

This may also hold for attributions of logical relations such as implication, as indicated by the validity of the inference of (113a) from (113b):

(113) a. The fact that S implies that S'.
b. That S implies that S'.

To a great extent, properties that can be ascribed to facts may thus be "read off" sentences not involving reference to facts.

[29] Note that not all attitude verbs taking explicit fact descriptions also allow for *that*-clauses. *Like*, for example, does not:

(i) a. John likes the fact that the house is big.
b. ⋆ John likes that the house is big.

A further question then is, why do facts not have causal properties, perceptual properties, and properties of internal structure? Clearly, such properties cannot be read off sentences in which only the relevant *that*-clause occurs *That*-clauses cannot figure in sentences describing the object of perception, but only those describing the result of a perception (as in *John saw that* S). Moreover, *that*-clauses cannot go together with predicates of parthood, internal structure, or extent:

(114) a. ??? That John likes Mary has John as a part.
b. ??? That John likes Mary is complex.
c. ??? That Sue loves Bill is greater than that John likes Mary.

Facts as derived, pleonastic entities do not as such have an internal structure or an extent and, moreover, are not located in space and time or could causally interact with other things in the world. Facts could not have the corresponding properties in a derivative way either, because there are no mechanisms available for attributing such properties to facts derivatively.

States can be attributed properties in just the same way as facts can; but in addition, states can be attributed properties of temporal duration, by inferences such as from (115a) to (115b):

(115) a. John was asleep for two hours.
b. The state of John's being asleep lasted two hours.

Facts and states are entities whose properties can be read off particular contexts in which corresponding true sentences occur. However, facts and states are not dependent on the particular sentences in question, in the relevant language. Facts are obtained from canonical fact descriptions, but as entities whose properties could be read off any true sentences whose meanings are the same as that of the sentence used in the canonical fact description. Thus, facts should have identity conditions that are independent of particular sentences in particular languages. Let us take sentences to express structured propositions, consisting just of properties and objects. Then the identity conditions of facts can be stated as below:

(116) For true sentences *S* and *S'*,
[*the fact that* S] = [*the fact that* S'] iff the structured proposition expressed by *S* is the same as the structured proposition expressed by *S'*.

What about the existence conditions of facts? Also here, independence of a particular sentence in a particular language obtains, since facts exist even if there is no language expressing them. This means that the operation of "fact formation" (expressed by *the fact that)* should apply also to structured propositions, whether or not expressed by a sentence.

What is the role of the sortal *fact* or *state* in canonical fact or state descriptions? These sortals restrict the way in which properties can be attributed derivatively to the entities in question based on sentences not involving reference to them.

This section has given only a sketch of an ontological account of facts and states and leaves still many questions unanswered, such as the question of the conditions under which an entity can be introduced on the basis of sentences not making reference to the entity and the question in which sense such entities exist.

Appendix: Tropes and events as truthmakers

Let me briefly discuss an alternative to the view of tropes and events as implicit arguments of adjectives and verbs. This is the view that tropes and events act as truthmakers. The purpose of this appendix is to sketch an account of adverbial modification based on truthmaking and present a number of arguments in favor of and against such an account.

The truthmaking idea says that for a sentence to be true there must be something, an entity in the world, which makes it true. The motivation for the truthmaking idea is the fundamental intuition that the truth of sentences should be grounded in reality. Roughly, given that grounding is a relation between a sentence and something else, there needs to be an entity which grounds the truth of a sentence, that is, in virtue of which a given sentence is true (Rodriguez-Pereyra 2005). Truthmakers thus are entities that are part of the world. A truthmaker is generally characterized formally in terms of entailment, by the following principle (Armstrong 1997):

(1) Truthmaker Principle
An entity *e* makes a sentence *S* true iff *e* exists and the existence of *e* entails the truth of *S*.

That is, the existence of a truthmaker necessarily entails the truth of the sentence.

The idea of truthmaking is a controversial, but often discussed, idea in contemporary metaphysics. It has rarely been explored for the purpose of natural language semantics, though. At the same time, it is not clear that it can truly be applied in linguistic semantics, a point I will come to later.

The advantage of making use of truthmaking in the context of the semantics of natural language is that the truthmaking relation makes entities available for the purpose of predication and quantification, without those entities acting as referents of referential terms, as implicit arguments, or as results of "reification."

There are quite different views about what truthmakers are. Some philosophers such as Russell and Armstrong take truthmakers to be states of affairs. Others such as Mulligan, Simons, and Smith (1984) take them to be tropes, events, or material objects. The latter obviously is the version to be used for present purposes, since then tropes are truthmakers of sentences with adjectival predicates such as (2):

(2) John is happy.

This version of the truthmaker theory would naturally take events and objects to be truthmakers as well: events for sentences with eventive verbs, as in (3), and objects for existential sentences such as (4b) and perhaps sentences attributing essential properties such as (4b):

(3) John was walking.

(4) a. There was a man in the park.
b. John is a man.

The truthmaking idea, on this version, would allow a straightforward account of adverbial modifiers, namely as predicates of truthmakers. This is indicated for (5a) in (5b), where $\models$ is the truthmaking relation:

(5) a. John is profoundly happy.
b. $\exists t$ (t $\models$ *John is happy* & profound(t))

Adverbials can also act as predicates of an entity that "incorporates" the contribution of another adverbial modifier, such as *suddenly* in (6a):

(6) a. The ball suddenly rolled very quickly.

Using truthmaking, this sentence can be analyzed as below:

(6) b. e $\models$ *The ball suddenly rolled very quickly* iff $\exists$e' $\exists$e"(e $\models$ <SUDDEN, e'> & e' $\models$ e' $\models$ <QUICK, e"> & e' $\models$ <QUICK, the ball>

In (6a), truthmaking is taken to hold not just between an entity and a sentence, but also between an event and a structured proposition, consisting of a property and an object. According to (6b), (6a) involves three truthmakers: the event of the ball's rolling (the truthmaker of the proposition that the ball rolled), the event of the ball's very quick rolling (the truthmaker of the proposition that the ball rolled quickly), and the suddenness of the ball's very quick rolling (which is the truthmaker for the entire sentence).

Let us see what is required of a truthmaker theory for it to be applicable to the full range of relevant sentences in natural language.

First, there is a strong and a weak version of the truthmaker theory. The strong version says that every true sentence needs to have a truthmaker (Armstrong 1997, Restall 1996). A weaker version does not require this for all sentences, for example not for negative sentences (Mulligan, Simons, and Smith 1984). Given that all sentences, including negative ones, can be modified by adverbial modifiers, the strong version of the truthmaker theory is needed for the present purpose.

Furthermore, there are two different views about how "big" the truthmaker of a sentence may be. While many assume truthmaking to satisfy Monotonicity (if e < e' and e $\models$ S, then e' $\models$ S), Rodriguez-Pereyra (2005) argues that a truthmaker should strictly consist only of features in virtue of which a sentence is true. Thus, for example, the sentence *John walks* is made true by a walking event of John, but not by an event that is a walking and yawning of John or an event that is a walking of John and Mary. This notion of a truthmaker is also what is needed for the semantics of nominalizations as well as adverbial modification. For example, *John's happiness*

could not possibly refer to a trope involving any properties on the part of John not constitutive of John's being happy, and it could not possibly refer to John and Mary's happiness. Similarly, *John is profoundly happy* could not possibly be understood as "John is happy and John and Mary's happiness was profound." For this reason, the relation $\models$ should be understood as a relation between an entity *e* and a sentence S that holds iff S is true in virtue of *all* the features of *e*, that is, *e* must be wholly relevant for the truth of S.

There are also different views on what conditions the relation of truthmaking should meet and on what the conditions are for the truthmaking of complex sentences. The following conditions on the truthmaking of disjunctions and existential sentences (formulated with substitutional quantification) are rather uncontroversial:

(7) a. $e \models S \vee S'$ iff $e \models A$ or $e \models B$
b. $e \models \exists x\, S$ iff for all substitution instances of S with respect to "x", $e \models S'$

More controversial are the ways in which the truthmaking of conjunctive and especially universally quantified and negative sentences should be treated. Let us see what conditions would be imposed by the behavior of adverbial modification.

Conjunctions require a possibly different truthmaker for each conjunct. Thus, one might take the truthmaker of a conjunction to be a set of events or tropes, such that each conjunct is made true by a member of that set. The present purpose requires a single truthmaker for conjunctions, though: conjunctions can be modified by a single adverbial, as in *slowly John came in and Mary went out*. The truthmaker of a conjunction thus should better be taken to be the sum of events or tropes making the conjuncts true:

(8) $e \models S \,\&\, S'$ iff there are entities e' and e" such that $e = \text{sum}(\{e', e"\})$, and $e' \models S$ and $e" \models S'$.

(8) presupposes unrestricted composition for events (that is, any two events have a sum).

While existential sentences involve truthmaking just like disjunctions, for universally quantified sentences, a corresponding account is not unproblematic. Mulligan, Simons, and Smith (1984) propose (9) (again formulated with substitutional quantification):

(9) $e \models \forall x\, S$ iff for all substitution instances S' of S (with respect to "x"), $e \models S'$.

However, as Russell (1918/19) and more recently Armstrong (1997, 2004) have already argued, universal quantification involves an irreducibly general fact for its truthmaking, namely the fact that a set is exhaustively included in another or that a set of entities exhausts a set. Such a fact is not reducible to a set of truthmakers of the corresponding atomic sentences. This stronger condition follows from the Truthmaker Principle: a mere sum of truthmakers for the instances does not strictly entail the truth of the universal quantification, but only the conjunction of the instances. Looking at natural language, we can see that the exhaustiveness condition is also needed for adverbial modification of universally quantified sentences, in cases such as the following:

(10) John quickly/carefully corrected every mistake.

What *quickly* and *carefully* may evaluate as the fulfillment of John's intention in (10) is the exhaustion of all the mistakes in John's acts of correction. Thus, the truthmaker of universal

quantification must be a trope or event genuinely supporting the generalization as such. This would also be needed for proportional quantifiers such as *most*.

A concrete proposal for the kind of truthmaker involved in universal quantification has been made by Armstrong (1997, 2004). Armstrong proposes that the truthmaker for the statement "All *P*s are *Q*" is the aggregate consisting of the sum (or aggregate) of the "singular" state of affairs "*d*'s being *P and Q*" and the state of affairs that consists in the aggregate of those singular truthmakers that constitute all states of affairs involving *P*. This proposal can straightforwardly be reformulated for events and tropes rather than states of affairs. The truthmaker of, for example, *all men are happy* will be the aggregate of the tropes of the sort "the happiness of *d*," where *d* is a man, and the relational trope that instantiates the "totaling relation" ALL by this aggregate and the property of being a man. Thus, the following condition would hold for the truthmaking of universally quantified sentences:

(11) $e \models$ *Every* A *is* B iff there are events e' and e" such that e = sum e"'[e"' = e' V e"' = e"], and for any substitution instance S of *every* A *is* B, there is an event e"', e"' < e" and e"' $\models$ S and e' = t(ALL, e", $\lambda e^{\star}$ [$e^{\star} \models$ S, for some substitution instance S of *every* A *is* B]).

In the case of proportional quantifiers as in *most men are happy*, the truthmaker would be the aggregate of tropes of the sort "the happiness of *d*", for, let's say, more than half of the men *d*, and the relational trope that consists in the instantiation of the making-up-half-of-relation by that aggregate and the property of being a man.

Negation is a difficult issue for the truthmaking idea:

(12) John is not happy.

Should negative sentences even have a truthmaker at all? That they do is in fact not only required by the general truthmaking idea, but also, in the present context, by the observation that certain adverbials may apply to a negative VP as in (13), which contains a frequency adverbial, now naturally viewed as a quantifier ranging over truthmakers:

(13) John frequently does not get up before 8 a.m.

Without entering the discussion of truthmaking of negative sentences as such, let us reformulate for the current purpose a proposal of Armstrong (2004) for negative sentences. Armstrong proposes that the truthmaker of a negative sentence *not* S is the state of affairs consisting of the aggregate of all the states of affairs (where none of them makes S true), the property of being a state of affairs, and the "totaling" relation ALL. That is, the truthmaker of a negative sentence is the state of affairs that consists in the condition that the aggregate of all the states of affairs exhausts all the states of affairs there are. Given the present terms, the truthmaking of a negative sentence will be as follows, for *E* the set of tropes or events, *sum* the sum operation, and *t* the function mapping a relation and two arguments to the corresponding relational trope ("the totaling of the property of being an event by the sum of all the events"):

(14) $e \models \neg$ S iff e = t(ALL, sum(E), E) and for no e' < sum(E), e' $\models$ S.

This proposal is suited for the semantics of adverbial modification if the totaling relation need not generally involve all states of affairs (or tropes or events), but rather may involve a contextual restriction to certain tropes or events, for example in (13) a contextual restriction to situations

involving John in the morning. Then in (13) *frequently* ranges over situations that are incompatible with John's getting up before 8 a.m., that is, events in which John gets up after 8 a.m. *Frequently* in (13) thus ranges over sums of events that together make up the contextually given restriction to a certain situation, entities of the sort t(ALL, sum(E), E_C), for some contextual restriction on events *C*.

Adverbial modifiers of universally quantified sentences as in (15a) can now be analyzed as in (15b):

(15) a. *John quickly eliminated every mistake*.
b. e ⊨ *John quickly eliminated every mistake* iff there is an event e', e ⊨ < QUICK, e'> & e' ⊨ <ELIMINATE, John, EVERY MISTAKE>

Here *e'* will be the trope t(ALL, sum e[for some mistake d, e ⊨ <ELIMINATE, John, d>]), λe[for some mistake d, e ⊨ <ELIMINATE, John, d>]).

Definite NPs with trope or event nominalizations should denote the truthmakers of the sentences that correspond to them. For simple nominalizations, the following would be the semantic analysis that comes to mind first:

(16) [*John's happiness*] = ιe[e ⊨ *John is happy*]

That is, *John's happiness* refers to the truthmaker of the corresponding sentence *John is happy*, that is, to the qualitatively minimal trope making that sentence true.

This is not satisfying, however, since it is not a compositional account. (16) makes the semantics of a noun dependent on the syntactic context in which the noun occurs (that is, dependent on which complement or specifier it takes). It is better to focus first on the semantics of nominalizations by using truthmaking as a relation between a trope or an event and a sequence of propositional constituents, as below:

(17) [*happiness*] = λed[e ⊨ <HAPPY, d>]

The denotation of a nominalization now depends only on the relation expressed by the verb or adjective from which the nominalization is derived and thus can proceed in an entirely compositional way:

(18) [*John's happiness*] = ιe[e ⊨ <HAPPY, John>]

However, this account is still not adequate. There may be many tropes that are truthmakers of *John is happy*. For example, some temporal part of a trope that is John's happiness might still make *John is happy* true. Obviously, J*ohn's happiness* refers to the maximal trope that makes *John is happy* true.

Where does the temporal maximality condition come from? The condition could not be a matter of the definiteness of *John's happiness* because it also is associated with quantificational NPs such as *every man's happiness*. It appears that the maximality condition is associated with trope nominalizations because they are mass nouns. *John's happiness* refers to the trope that is maximal with respect to occupying a continuous stretch of time, just as the mass NP *the water in the room* refers to the maximal quantity of water that is in the room (cf. Sharvy 1980). The semantics of trope nominalizations must thus be revised as follows:

(19) [happiness] = λed[e = max e'[e' ⊨ <HAPPY, d>]]

One major advantage of applying truthmaking to the semantic of adverbial modifiers and nominalizations is that it captures well the intuition that a simple subject–predicate sentence such as *John is happy* is just about John, not "John's happiness." "John's happiness" comes to play a semantic role only via the truthmaking relation. The truthmaking relation allows the referent of *John's happiness* to be a concrete entity, more specific than the description used to refer to it, without, though, acting as an implicit argument of the predicate.

However, the application of the truthmaking idea to natural language semantics also comes with serious problems. The truthmaker of a sentence will have to be identified in different ways depending on whether the sentence is negative, quantificational, or conjunctive. This may hold even for simple subject–predicate sentences. The condition on the world that natural language predicates impose may be negative, quantificational, or conjunctive even if the predicate is simple. For example, *clean* is best understood as "absence of any dirt," *dirty* as "presence of some dirt." While the negative or quantificational condition in this case arguably forms part of the lexical content of the adjectives that speakers have learned, in many cases the condition the predicate imposes on the truthmaker may not be part of a competent speaker's knowledge of language. A predicate may ultimately turn out to be negative (requiring the absence of tropes of a certain sort) or quantificational, without any speaker yet knowing that. It depends entirely on what science ultimately says about how such predicates are made true and thus how the truthmakers are to be identified. However, this means, quite simply that the truthmaking idea, at least in its current versions, cannot be used for the semantics of constructions involving adjectives.

A second problem for the truthmaking idea comes from comparatives. We have seen that NPs like *John's strength* cannot just refer to physical conditions. They must refer to tropes individuated also with respect to the order given by the underlying adjectival concept. This means that they cannot just refer to the truthmaker of a sentence consisting of a suitable subject and the adjective. Also for simple comparatives, such as *Mary is weaker than Sue*, the truthmaking idea is in difficulty. The sentence would have to be true on the basis of Mary's condition and Sue's condition. However, the question is, what makes them stand in the relation "weaker than," that is, what in the world is it from which the truth of the sentence *Mary is weaker than Sue* follows? This can only be the ordering that the adjective itself imposes on the physical conditions in question, the ordering given by the content of the adjective *weak*. This again means that the truthmaking idea is not suited for the semantics of adjectives, at least not the gradable ones.

That said, truthmaking might have applications in other areas of natural language semantics. In fact, I will later (Chapter 5) make use of it in a different context, namely for the semantic analysis of transitive intensional verbs such as *need*. I will argue that the semantics of such verbs involve situations satisfying a "need" and that the relation of a situation satisfying a need should be understood as a generalization of the truthmaking relation.

3

The Semantics of Special Quantifiers in Predicate Position

"Special quantifiers" in English are quantifiers like *something, everything, nothing*, and *several things*. They are special in their ability to replace various kinds of non-referential complements, complements that do not refer to an object that is to act as an argument of the predicate. Thus, the special quantifier *something* replaces a predicative complement in (1b), a clausal complement in (2b) (a non-referential complement as well, as I will later argue), a complement of a transitive intensional verb in (3b), and a measure phrase in (4b):

(1) a. John became wise.
b. John became something.

(2) a. John thinks that Mary is happy.
b. John thinks something.

(3) a. John needs a secretary.
b. John needs something.

(4) a. John weighs 100 pounds.
b. John weighs something.

Special quantifiers also include certain definite NPs, such as *the same thing*. They have the same ability to replace non-referential complements:

(5) a. John is the same thing as Joe, namely a schoolteacher.
b. John thinks the same thing as Joe, namely that it might rain.
c. John needs the same thing as Joe, namely two competent secretaries.

Special quantifiers need not contain the morpheme *–thing*. The relative pronoun *what* and the anaphoric pronoun *that* have the same ability to replace non-referential complements:[1]

[1] Special NPs do not include definite plural pronouns such as *they*, since such pronouns cannot anaphorically relate to predicative complements even when they are conjoined and thus would define a plurality of

(6) a. Mary is what John is, namely very happy.
b. Mary thinks what John thinks, namely that it might rain.
c. John needs what Joe needs, namely two competent secretaries.
d. John weighs what Mary weighs, namely 100 pounds.

(7) a. Mary is very wise. John is that too.
b. Mary thinks that it might rain. John thinks that too.
c. John needs two secretaries. Joe needs that too.
d. John weighs about 100 pounds. Mary weighs that too.

In what follows, when talking about special quantifiers, I mean to include those special pro-forms as well.

Special quantifiers in the various constructions in which they may occur are of great interest philosophically. Special quantifiers have been at the center of debates as to whether natural language allows reference to and quantification over abstract meanings (such as properties, concepts, propositions, or functions of various sorts). Let me call the approach that takes special quantifiers to range over abstract meanings the *Abstract Meaning Theory* of special quantifiers. The Abstract Meaning Theory takes special quantifiers to range over entities that are the meanings or referents of the expressions whose place the special quantifiers take. Given a standard, Quinian, view of ontological commitment (which ties ontological commitment to an object to its being the value of a variable), special quantifiers carry an ontological commitment to entities that are abstract meanings, that is, to properties, concepts, propositions, or functions of various sorts.

The Abstract Meaning Theory contrasts with a position that I will call the *Non-Objectual Theory* of special quantifiers. The Non-Objectual Theory denies that special quantifiers range over objects of any sort. The Non-Objectual Theory can be spelled out in various ways, as substitutional quantification, as the view on which the semantic contribution of quantifiers exhausts itself in the inferential potential of the quantificational sentence, and in a view on which quantification is taken to be primitive, not to be defined formally at all.

I will argue that both the Abstract Meaning Theory and the Non-Objectual Theory are inadequate as analyses of special quantifiers in natural language. I will argue for an analysis of special quantifiers that differs fundamentally from both. This analysis is what I will call the *Nominalization Theory* of special quantifiers. On the Nominalization Theory, special quantifiers act as *nominalizing expressions*, in addition to being quantifiers. In their nominalizing function, they introduce a domain of objects that consist of possible referents of the relevant sorts of nominalizations. Thus, the special quantifier

properties. It is only when properties are referred to by referential NPs that they go along with plural pronouns:

(i) a. John became wise and calm. Mary would never become that/??? them.
b. John has the property of wisdom and the property of calm. Mary does not have them.

something ranges over things like "John's wisdom" or "wisdom" in (1b), over things like "thoughts" in (2b), over things like "needs" in (3b), and over things like "weights" in (4b), rather than over properties, propositions, intensional quantifiers (or properties), or numbers (or "degrees"). The entities the special quantifiers range over are just the kinds of entities one would refer to with familiar nominalizations, such as *John's wisdom* or *wisdom, John's thought that S* or *the thought that S, John's need for a secretary* or *the need for a secretary, John's weight of 100 pounds* or *the weight of 100 pounds*. The objects so introduced serve the purposes of quantification, modification, and demonstrative or anaphoric reference, but not that of the satisfaction of a predicate.

The Nominalization Theory does not generally conform to Neutralism (MacBride 2006), the view that denies that quantificational sentences are grounds for more of an ontological commitment than the corresponding non-quantificational sentences. Given neutralism, quantifiers range over objects and thus are ontologically committing to entities of a certain sort *only* if the corresponding non-quantificational sentences are themselves ontologically committing to such entities. The Nominalization Theory takes special quantifiers to be objectual and to introduce their own domain of entities. Still it may be that those very same entities would also be involved in the semantic evaluation of the substitution instances of the relevant quantificational sentences. This will in fact be the case for special quantifiers taking the place of predicative "complements".

In this chapter, I will focus on special quantifiers when they take the place of predicative complements—*pro-predicative special quantifiers*, for short. Special quantifiers in that function are highly interesting philosophically. When they take the place of predicative complements special quantifiers generally figure in examples that are central in philosophical discussions regarding the meaning and semantic role of predicates, the ontological status of properties, and the status of higher-order logic. However, in those discussions not much attention has been paid to the actual linguistic properties of pro-predicative special quantifiers. A closer look at their linguistic properties will in fact shed a significantly different light on how such quantifiers in natural language should be analyzed. I will argue for an analysis according to which the quantifiers in question are nominalizing quantifiers: they have both a quantificational and a domain-introducing function. For the domain of quantification they make available the same entities that nominalizations of predicates refer to, that is, noun phrases like *John's wisdom* or *wisdom*, noun phrases which refer either to tropes (*John's wisdom*) or to kinds of tropes (*wisdom*). In fact, in general the objects introduced by special quantifiers are tropes or kinds of tropes.

Even though this chapter focuses on special quantifiers when they take the place of predicative complements, as in (1b), the analysis that it develops is designed to be carried over to other kinds of non-referential complements as well, and in the subsequent chapters, we will see how this can be achieved.

Special quantifiers were already mentioned in relation to plural noun phrases and kind terms. Recall that special quantifiers can replace plurally referring terms while

preserving the acceptability or the same reading of the predicate. At the same time, they can have count occurrences, apparently counting pluralities, as in (8):

(8) John compared two things, the beans and the rice/beans and rice.

Special quantifiers, recall, have a nominalizing function here as well: they apply to a plurality "as many" and map it onto a single collective entity, a plurality as one.

Special quantifiers occur in many languages, in different forms. In many languages, they are formed without a special morpheme, such as *–thing* in English. The morpheme *–thing* is a morpheme that occurs as a bound morpheme with certain quantifiers (*something, nothing, everything*) and as an independent word with others (*several things, many things*). It is a "special" morpheme that helps form complex expressions that may be used as special quantifiers. However, special quantifiers need not involve a special morpheme. For example, in German *alles* "everything" and in French *tout* can act as special quantifiers.

In English, there are other morphemes, though, with which complex expressions can be formed which can act as special quantifiers. In particular, the noun *way* as well as the nouns *color, height*, and *length* can act that way, and I will turn to those briefly at the end of this chapter.

1. Non-Objectual and Abstract Meaning Theories of special quantifiers

1.1. The Non-Objectual Theory

The main philosophical interest in special quantifiers in predicative position has been whether pro-predicative quantifiers are ontologically committing, and if such quantifiers are ontologically committing, what kinds of entities they range over and in what sort of semantic relation such entities stand to the predicates the quantifiers may replace.

There are three non-objectual views of special quantifiers in predicate position that can be distinguished: the substitutional analysis, Prior's view, and Wright's account. All three views share fundamental problems of empirical adequacy concerning the linguistic properties of pro-predicative special quantifiers. In addition, they have particular problems of their own. The most obvious ones I will only briefly mention, since they are rather familiar.

On a substitutional analysis, an existentially quantified sentence is true just in case some substitution instance is true, and a universally quantified sentence is true just in case every substitution instance is true.[2] Substitutional quantification suffers from a well-known problem in that it makes the truth of a quantificational sentence

[2] See Barcan Marcus (1972, 1978) for the notion of substitutional quantification.

dependent on the existence of predicates in the language, whereas a sentence like *John is something Mary isn't* is true even if the only properties John has but Mary does not are inexpressible in English.

Prior (1971), for this reason, rejects substitutional quantification. On Prior's view, pro-predicative quantifiers should not be given any formal definition at all; all that can be said about them is that the existence of substitution instances is a necessary, but not a sufficient, condition for the truth of the quantificational sentence. This version of the non-objectual view of quantification is generally considered unsatisfactory.

Wright's (2007) version of neutralism emphasizes the inferential potential of special pro-predicative quantifiers: the semantic contribution of pro-predicative quantifiers consists solely in their inferential potential, which licenses inferences such as universal instantiation and existential elimination.[3] Crucially for Wright, the inferential potential concerns not just sentences, but also Fregean thoughts, viewed as structured complexes of concepts. Thus, on Wright's view, the semantic role of a pro-predicative quantifier is exhausted by the various inferential relations that sentences containing it bear to other sentences or thoughts.

There is one major problem of empirical adequacy that arises for the substitutional account and in a related way, for Wright's account. This is that special quantifiers do not care about syntactic and semantic requirements in the way they would have to if they were substitutional. Consider the special quantifier *something* in (9a) and (9b):

(9) a. John became something that caused Mary great distress (namely addicted to drugs).
b. John became something I never expected (namely a pianist).
c. John is something I admire.

(10) a. John became something nice (namely a ballet dancer).
b. John remained something that is highly admirable, namely completely calm.

(11) a. What John is is nice.
b. I admire what John has become.

In (9a), being a complement of *become*, the special quantifier *something* would require a predicative NP or an AP as substituent; but at the same time, binding a variable that acts as the subject with respect to *caused*, it would also require a clause or referential noun phrase as substituent. Clearly, no expression can satisfy these two conditions simultaneously. In (9b) and (9c), *something* would require its substituent to be a predicative complement (an adjective or predicative NP) and at the same time the object of *expect*

[3] See also Hofweber (2005b) for the view that the semantic contribution of some quantifiers is exhausted by their inferential potential.

or admire, which is impossible since *expect* and *admire* do not select predicative complements (⋆ *I expect wise*, ⋆ *I admire wise*).[4]

(10a) shows the same thing. Here *something* would require its substituent to be a predicative expression (as complement of *become*) and at the same time a referential NP (as complement of *expect*), which is impossible (⋆ *I expected wise*). In (10b), *something* requires a predicative NP or an AP on the one hand and a referential NP (subject with respect to *nice*) on the other hand. The same point is made by the free relative clause constructions in (11a, b).

Special quantifiers may relate to syntactic positions that impose incompatible syntactic and semantic requirements on the substituent, and therefore they cannot be substitutional.

A related problem arises for Wright's version of the Non-Objectual Theory, a problem it shares with the Abstract Meaning Theory (which I will turn to shortly). Wright's version presupposes a notion of a Fregean thought as a structured complex of concepts. Wright is not very explicit about how such thoughts are to be understood. If they involve a distinction between objects and concepts, the same problem arises as for any abstract meaning theory that makes the distinction, a problem I will discuss in the next section.

An alternative would be to incorporate a proposal made in Wright (1998). According to that view, a referential term like *the concept horse* and the predicate *is a horse* involve the same entity, a property; but they involve it in different semantic relations: reference in the former case and attribution in the latter case. Given this proposal, the variables that the pro-predicative quantifier binds are to be replaced by constituents involving the same property, but with the property acting as an object of reference in one case and as an object of the attribution relation in the other case. On this view, the problem of type discrepancy would be solved: the quantifier can relate to syntactic positions with different semantic roles, as long as these roles may involve one and the same property.

What is unsatisfactory about this elaboration of Wright's account is that it undermines the motivation of the neutralist view that Wright (2007) tries to pursue. If the inference requires properties which may themselves act as objects of reference and arguments of first-level predicates, then having the quantifier range over properties directly would be as neutralist as the inferentialist account that Wright proposes.

The conclusion therefore has to be that special quantifiers are objectual. Given the standard view about quantifiers, this means that they must range over potential

[4] One might argue that (9b) involves an elliptical clause, as below:

(i) John became something that I never expected [him to become].

However, ellipsis would hardly be an option in (9a) (*cause* does not take a clause in subject position) and (9c) (*admire* does not take clausal complement). Ellipsis is also not a plausible option for (10a) and (10b). *Nice* and *admirable* here do not evaluate facts about John (but things like "being a ballet dancer" or "complete calm").

arguments of the predicate. However, this is not so on the Nominalization Theory of quantifiers that I will elaborate later.

1.2. The Abstract Meaning Theory

1.2.1. The Abstract Meaning Theory and its problems On the Abstract Meaning Theory, special quantifiers are objectual, and what they range over are the entities that predicative complements stand for, namely properties or concepts.

Two approaches to what predicates stand for need to be distinguished. On one approach, the Fregean approach, predicates stand for entities fundamentally different from objects. For Frege these are concepts, unsaturated entities whose role is to be applied to objects to yield a truth value. On Frege's view, predicates refer to concepts; but the Abstract Meaning Theory may alternatively take predicates not to refer like names, but rather to "express" or "mean" concepts.

There are various internal problems with the view that predicates stand for concepts, as entities fundamentally distinct from objects, and moreover, for the view that predicates refer to them.[5] What is also subject of a debate is the question of the semantic status of the copula: is the copula redundant or is it in fact responsible for the unsaturatedness of the meaning of the combination of copula and predicative complement? Moreover, it is a subject of a major debate in philosophical logic whether second-order logic carries an ontological commitment to sets.[6] For now let us focus first on the following simple question: given a view on which predicates express or denote concepts (or whatever entities distinct in type from individuals), do special pro-predicative quantifiers range over them rather than over objects?

The answer must be negative. There is clear evidence that special quantifiers do not respect any distinction in type between concepts and objects. Special quantifiers may at the same time bind predicate variables and object variables or even bind a single variable that has both the status of a predicate variable and an object variable. For example, pro-predicative special quantifiers can take first-level predicates as restrictions, that is, predicates of objects:

(12) a. John became something that is admirable.
b. John has become something that Mary has become too, which is something admirable.
c. John has become something admirable.

In (12a), *something* would bind both a predicate variable (in the main clause) and an object variable (in the relative clause). In (12b), *something* binds two predicate variables as well as an object variable. In (12c), *something* binds a predicate variable whose restriction is a predicate of objects.

[5] See MacBride (2006) for discussion and further references.
[6] See Boolos (1984, 1985) for discussion.

Special relative clauses make the same point: they may act as referential terms that would refer to a concept while at the same time allowing for a first-level predicate, a predicate predicable only of objects:

(13) What John has become is admirable.

In (13), *what John has become* should refer to a concept, but *is admirable* is predicable only of objects. (Note the ungrammaticality of ★ *wise is admirable*.)

Thus, the view that special quantifiers range over concepts as type-distinct from objects is untenable. Special quantifiers rather range over entities in a way that is "beyond types."

Suppose then that pro-predicative special quantifiers range over properties, but not in the sense of entities type-distinct from objects, but rather over properties that are objects. Such properties would also be the referents of explicit property-referring terms like *the property of being wise* or *the property of wisdom*. The view that pro-predicative quantifiers range over property objects is compatible with a view on which properties are not the referents of predicates, but rather bear a different semantic relation to the predicate, such as being "expressed by" or being "attributed by" the predicate. In whatever way that view may be elaborated, it is problematic as well.

One problem for the view is that special NPs can relate to two syntactic positions at once, one of which does not require a property:

(14) a. John became something Mary never imagined (namely wise).
b. ?? Mary never imagined the property of being wise.

(15) a. John became something Mary never thought possible, namely extremely athletic.
b. ?? Mary never thought the property of being athletic possible.

(16) a. John became something unusual, namely a harpsichord maker.
b. ?? The property of being a harpsichord maker is unusual.

(17) a. John is everything Mary despises.
b. Mary despises the property of being wise.

(18) a. John has become everything Bill aspires to.
b. ?? Bill aspires to the property of wisdom.

In (14a), *something* relates to the argument position of a predicate requiring a property and the argument of a predicate not naturally allowing for properties as arguments, as seen from (14b). Also in (15a), *something* relates to an argument position requiring a property and another one not naturally allowing for a property, as seen in (15b).

Similarly for (16)–(18). The special quantifiers here clearly cannot quantify over objects that could fit the two syntactic positions the quantifier relates to.[7]

There are restrictions, though, on what kinds of syntactic positions pro-predicative special quantifiers can relate to. It depends on both syntactic requirements and the lexical context of predicates. For example, the following sentences are unacceptable:

(19) a. ??? John became something Mary did not say.
b. ??? John is something Mary was thinking.

Say and *think* in (19) selects both NPs (*Mary said these words, John thought that*) and *that* clauses, just like *imagine* and *expect*. Yet pro-predicative quantifiers cannot bind variables in the object position of those verbs.

The condition on the verbs to whose object position pro-predicative special quantifiers may relate is not that they allow for *that*-clauses. Rather those verbs also must allow for NP complements. *Complain* is a rare verb that takes *that* clause complements, but not NP-complements (*John complained that* S, ⋆ *John complained something*). However, *complain* does not allow pro-predicative special quantifiers to bind a variable in its object position. Only *complain about* does:

(20) a. ⋆ John is something Mary complained.
b. John is something Mary complained about.

Thus, pro-predicative quantifiers must introduce an object of reference to fill in the argument position of the verb, and, as we have seen, this object cannot be a property. It could not be a proposition or fact either, because of cases like (14a) (??? *Mary imagined the proposition/fact that* S), or a possibility, because of cases like (15a) (?? *Mary never thought the possibility that S possible*). The only object suited for all the cases in (14a–18a) is the referent of a nominalization, such *John's wisdom* or *wisdom*, that is, a trope or a kind of trope. This is what will motivate the Nominalization Theory of special quantifiers, which I will discuss in the next section.

Besides special pro-predicative quantifiers being able to relate to syntactic positions one of which would not require a property, there are further problems for the view that pro-predicative special quantifiers range over properties. The things that pro-predicative special quantifiers range over have simply different sorts of properties or trigger different sorts of readings of predicates than is expected for property objects (that is, for entities that could be the referents of explicit property-referring terms).

[7] Again, one might argue in some of the cases that ellipsis is involved. For example, (14a) might be elliptical for (ia) and (18a) for (ib):

(i) a. John became something Mary never imagined [him to become e].
b. John has become everything Bill aspires [PRO to become e].

However, it is not plausible that ellipsis is at stake in (16a) and (17a) (*despise* does not take *that*-clauses as complements, but requires extraposition as in *Mary despises it that* S).

First, pro-predicative special quantifiers range over things that can have perceptual and causal properties:

(21) a. John is something I had never noticed before, namely very diligent.
b. John is everything that can make Mary upset.

This is of course not surprising if *something* ranges over tropes.

Moreover, evaluative predicates evaluate the entities pro-predicative special quantifiers range over differently from the way they evaluate property objects:

(22) a. John became something admirable, namely wise.
b. The property of being wise is admirable.

(23) a. John has become something surprising, namely fluent in Chinese.
b. The property of being fluent in Chinese is surprising.

Whereas (22a) and (23a) are perfectly natural, with *admirable* and *surprising* evaluating "what John has become" (namely John's wisdom or John's fluency in Chinese), (22b) and (23b) are strange.

The sorts of predicates acceptable with pro-predicative special quantifiers thus indicate that such quantifiers range over tropes or kinds of tropes (that is, possible referents of adjective nominalizations), rather than properties as standardly understood.

1.2.2. The Relational Analysis and its problems The Abstract Meaning Theory of pro-predicative special quantifiers raises another important problem, which concerns the logical form of sentences. If special quantifiers range over property objects, it is reasonable to assign a particular semantic role to the copula, rather than leaving it semantically vacuous, namely the role of attributing the property in question of the referent of the subject.[8] That is, the copula would express the relation of attribution, a relation between objects (as denoted by the subject) and properties (that is, property objects). The view that special quantifiers range over properties thus naturally goes along with a *Relational Analysis* of the semantic relationship between copula and predicative complement. On the Relational Analysis, predicative APs and NPs denote properties that provide arguments for a relation expressed by the verb, as in (24a) and (24b), for (1a) and (1b):

(24) a. become(John, λx[wise(x)])
b. $\exists$x(become(John, x) & admirable(x))

The Relational Analysis, however, faces serious problems of its own.

One major problem for the Relational Analysis is certain striking differences in linguistic behavior between referential NPs and predicative complements. Referential

[8] Wiggins (1984) in fact argues that it is the copula that ensures unsaturatedness, and that the adjective alone contributes a concept that as such is not unsaturated.

NPs generally allow for substitution by co-referential NPs in extensional contexts. Whenever the NP is replaced by a co-referential NP, the same truth value for the entire sentence will be preserved (even if some awkwardness may result). Thus, the sentences in (25) have the same truth value, as long as Mary is the mother of Sue, whom Sue likes, or the entity that . . . (any description to follow):

(25) a. John likes Mary.
b. John likes the mother of Sue.
c. John likes whom Sue likes.
d. John likes the entity that . . .

However, predicative complements do not generally allow for a replacement by a referential or quantificational NP. The result is either unacceptability or a different reading of the verb:

(26) a. John became wise.
b. ??? John became the property of being wise/some property.
c. ??? John became the same property as Mary, namely a lawyer.
d. ??? John became every property Mary is—nice, beautiful, intelligent.
e. ??? John became every property he wanted to become.

(26a) (*John is wise*) does not imply (26b), which, like the sentences (26c–26e), is unacceptable (that is, could not possibly be true, except in certain contexts of metaphysical fantasy). Let me call this the *Substitution Problem*.

When a predicative complement is replaced by a referential NP such as *every property*, the reading of the verb changes, resulting in the reading the verb would have when taking ordinary referential NPs—such as the identity reading in (27):

(27) John became Bill.

Let me call this the *Objectivization Effect*.

Failure of substitution of a predicative complement such as *wise* by *the property of being wise* could not be explained by something like the ordinary speaker's lack of knowledge that the denotation of a predicate is a property, or her lack of knowledge of the proper use of such metasemantic terms as *property*. Even when a particular speaker knows that the denotation of a predicate is a property, the sentences in (26b–e) are infelicitous: they are just as bad for a philosopher or semanticist as for anyone else. There is always a clear difference between the kind of unacceptability arising from substituting a non-referential complement by a metasemantic description of its denotation and the kind of unacceptability below arising from the replacement of a referential NP such as *the tree* by something like *the object referred to by . . .* :

(28) a. John saw the tree.
b. John saw the object referred to by my previous utterance of *the tree*.

Even if not entirely felicitous, (28b) is still acceptable in a technical extension of English (and as such is a valid inference from (28a)). There are, moreover, needless to say, many contexts in ordinary English in which an NP with *property* as head noun is perfectly acceptable. Finally, failure of substitution can be observed also with descriptively empty nouns such as *entity, object,* or *thing*, the latter hardly requiring any technical semantic knowledge:

(29) ??? John became some entity/some object/some thing (namely wise).

The reason for the unacceptability of referential NPs on the relevant reading also cannot be that the verbs do not select such NPs syntactically. The same verbs can take special quantifiers as complements, which do not display the Substitution Problem or the Objectivization Effect:

(30) a. John became something Mary already is.
b. John became nothing interesting.

The contrast between special and ordinary NPs is displayed in a particularly striking way by the pair of sentences below, where *become* in (31a) has a predicative reading and in (31b) displays the Objectivization Effect:

(31) a. John became something admirable.
b. John became some admirable thing.

There appears to be no straightforward syntactic explanation of the Substitution Problem and the Objectivization Effect. Special quantifiers behave like ordinary NPs in all purely syntactic respects. For example, they must be assigned case and cannot occur in positions where only clausal complements or other non-NPs can appear for syntactic reasons.

Let us then consider possible semantic explanations. One might try to explain the Substitution Problem and the Objectivization Effect by appealing to a distinction in semantic relations, namely that between referring and expressing. Predicative complements do not *refer* to entities in the way referential NPs do, but instead *express* them, and what copula verbs require is that their argument is expressed rather than being referred to by their complement. This explanation is unsatisfactory, however: once an entity *d* acts as an argument expressed by the predicate, the relation between *d* and the expression that denotes or refers to *d* could not make any difference to the logical form of the sentence which is of the type *R(a, d)*. The difference in semantic relations could only manifest itself in the nature of the predicate itself: if the complement must express the property, rather than refer to it, then this can mean only that the copula requires a complement with a particular semantic function, that of expressing a property. A complement of this sort must be syntactically identified as having predicative status. This means that the requirement is a syntactic condition imposed by the copula on its complement, namely that the complement be of predicative type. Thus, the Substitution Problem and the Objectivization Effect would be accounted for by a syntactic

requirement imposed by the copula, requiring a predicative complement. Special quantifiers would be exempt from that requirement.[9]

1.2.3. Second-order logic and the type-theoretic approach Another semantic approach to predicative complements is that of second-order logic and type theory. This approach is a dominant one both in philosophical logic and in linguistic semantics. It should also be counted as a Fregean approach, in that it draws a distinction between objects and predicate denotations. That is, predicates and singular terms are assigned distinct types associated with different domains from which they take their semantic values. Whereas singular terms take their denotation from the domain of objects (which itself may include properties), the denotation of predicates is construed as a set or a function from entities to truth values. Distinguishing the denotation of the predicate from the denotation of a singular term serves the purpose of compositionality: it ensures that by function application, the denotation of the sentence consisting of the predicate and the term is a truth value. The denotation of a predicate as a set or function thus captures its semantic contribution to the compositional semantics of the sentence. Such a denotation may coincide as an entity with an element in the domain of objects, but in fact it must be understood as representing the semantic function of the syntactic category of predicates, rather than as a particular kind of object. Sets or functions in the domain are among the objects the language is committed to, but sets or functions as predicate denotations need to be understood as representing the role of predicates in the semantic composition of the sentence.

[9] Note also that predicative complements differ from referential ones also with respect to syntactic properties. Unlike referential complements and like adjuncts, they cannot be extracted from weak islands such as *that*-clauses in the scope of negation, as seen in the contrast between the ambiguous (ia) and the unambiguous (ib) and the contrast between (iia) and the unacceptable (iib) (cf. Rizzi 1990):

(i) a. It is for this reason that I believe that he was fired *t*.
b. It is for this reason that I do not believe that he was fired *t*.

(ii) a. It is unhappy that I think John became.
b. It is unhappy that I do not think John became.

Predicative complements are unlike adjuncts, though, not because they are obligatory. Adjuncts can be obligatory, like *badly* in (iiia) or *until everyone had left* in (iiib), or optional, like *slowly* in (iva) or *until she was exhausted* in (ivb):

(iii) a. John behaved badly.
b. The party lasted until everyone had left.

(iv) a. John walked slowly.
b. Mary walked until she was exhausted.

Moreover, (optional and obligatory) adjuncts generally do not allow extraction of wh-phrases, as in (v) but predicative complements do, as in (vi):

(v) a. * Who did the party last until Mary talked to *e*?
b. * Who did John do while Mary talked to *e*?

(vi) Who is John proud of *e*?

It is for this reason that non-referential complements are generally taken to be assigned theta roles (cf. Chomsky 1981).

This is even more obvious with type theory. The distinctions among the types of type theory represent in fact distinctions among the semantic contributions of different sorts of syntactic categories (or syntactic functions) to a proposition. Type theory establishes a close correspondence between syntactic categories and denotations, by specifying that an expression belonging to a category of a given type must have a denotation that comes from a particular domain of entities, the domain that corresponds to that type. There are basic types, such as *e* and *t*, which, even though they are distinct as types, may have overlapping domains. For example, truth values can be the semantic values of both sentences and noun phrases (*the truth value true*). Complex types such as <*a, b*> consisting of types *a* and *b* have a domain that consists in functions from entities in the domain of *a* to entities in the domain of *b*. The syntactic operation of combining expressions is generally matched with the semantic operation of function application. That is, if an expression *A* is of type <*a*, *b*> and another expression *B* of type *a*, then the denotation of the combination of *A* and *B*, *A*^*B*, will be the application of the function denoted by *A* to the semantic object denoted by *B*, that is, [*A*]([*B*]). As a result, *A*^*B* will be of type *b*.

An expression of a category that corresponds to type *e* will have as its denotation an element of the domain *D* of entities. An expression of (a category that corresponds to) type <*e*, *t*> will have as its denotation an element of the domain of functions from *D* to the set of truth values{1, 0}. An expression of type <*s*, *t*> will have as its denotation an element of the domain of functions from the set of possible worlds *W* to {1, 0}.

Applying type theory to natural language requires assigning particular types to syntactic categories. It is well known, however, that it is not possible to establish a one-to-one correspondence between natural language syntactic categories and types (cf. Williams 1983). For example, NPs can be of type *e* (referential NPs, which take individuals as denotations), of type <<*e*, *t*>, *t*> (quantificational NPs, which take as denotations functions from sets of individuals to truth values), or of type <*e, t*> (or <*s*, <*e*, *t*>>) (predicative NPs, which take as denotations functions from (worlds to functions from) objects to truth values). What is required therefore is an assignment of types to syntactic categories when they play a particular semantically relevant syntactic role.

The type-theoretic perspective would account for the substitution problem and the Objectivization Effect in the following way. If a predicative complement is substituted by a referential NP, unacceptability or a different reading results because the referential NP is of a different type from that of the predicative complement. Type theory does not (or rather does not on all versions) say that this means that the predicate or a particular meaning associated with it requires one object rather than another. The acceptable and the unacceptable sentence (or the one with a different reading of the predicate) may involve exactly the same object as the argument of the predicate. This is because the same object may belong to the domains of two different types. For example, type theory specifies that all referential NPs—including *the property of being P*—are of type *e*, but it does not prevent an object actually denoted by such an NP

being exactly the same as that denoted by a particular sentence (a proposition)—even though a sentence will be of type <*s*, *t*>. Types, in other words, do not serve to distinguish objects, but rather objects together with the categories of the expressions that denote them. To look at the differentiation among types as an ontological distinction would be a misguided projection of syntactic categories onto ontology.

This means, however, that a type-theoretic account of the Substitution Problem has to assume that the predicate does not really denote a two-place relation (which could be defined in terms of how objects themselves relate to each other). Instead, it has to adopt one of two alternatives. The first alternative is that the predicate denotes a three-place relation taking two objects and a syntactic category as arguments. The second alternative is that only the predicate together with the denotation of the complement and its syntactic category expresses a one-place relation or property. This is, in fact, saying, though, that the predicate and the complement by themselves have the status of syncategorematic expressions, that is, expressions that do not have an independent meaning, but rather make a semantic contribution to the sentence only relative to the syntactic context in which they occur.

Type theory also fails to explain the Objectivization Effect. Type theory would say that a verb like *imagine* is ambiguous, being specified for type <*e*, <*e*, *t*>> (<<<*e*, *t*>, t>, <*e*, *t*>>) as well as for type <<*s*, *t*>, <*e*, *t*>>. However, as a matter of fact, *imagine* may take exactly the same objects as arguments in the two cases. Moreover, on both the content-related and the object-related reading, *imagine* syntactically selects NPs as arguments. Thus, the two lexical meanings cannot just be tied to semantic selection or in purely syntactic selectional requirements. Which meaning of *imagine* to choose when interpreting a sentence would rather depend on the semantic role associated with the syntactic categories of the complement, that is, on a partly syntactic object.

Type theory also does not account well for special NPs. To account for special NPs, it would require the assignment of types to be based not only on syntactic categories, but also on lexical choice. As mentioned, special NPs behave like ordinary quantificational NPs in all syntactic respects and thus should not form a separate syntactic category. However, since special NPs do not block substitution and do not lead to the Objectivization Effect, they would have to be of a different type than ordinary referential or quantificational NPs, namely of the same type as the predicative complement.

Type theory thus represents a reification of semantic roles associated with particular syntactic (syntactically and lexically identified) functions of expressions in a sentence. It does not provide a solution to the Substitution Problem and the Objectivization Effect of its own.

The type-theoretic account of predicate denotations as functions from objects to truth values (possibly relative to a world and a time) faces a problem in itself. If predicate denotations are construed as functions in that way and nominalizations of predicates are taken to refer to such functions, then this leads to the problem of the self-application of functions, in examples such as (31a, b) (Chierchia and Turner 1988, Turner 1989):

(32) a. To be nice is nice.
b. Everything has the property of being self-identical.
Thus, the property of being self-identical is self-identical.

If infinitival clauses such as *to be nice* are taken to denote the same function as is supposed to be denoted by the predicate *nice*, then (32a) expresses self-application of a function to itself, which is impossible given the set-theoretical notion of a function. The same holds for (32b) if *the property of being self-identical* is to denote the same function as the predicate *is self-identical* is supposed to denote.

The following general strategy has been proposed as a solution to the problem of the self-application of properties (cf. Chierchia and Turner 1988, Turner 1989). When a predicate applies to a property, it does not apply to a higher-order object, a function. Instead, it applies to a primitive object, which only "corresponds" to that function. Such an object is made available by positing a *nominalization function* that maps functions onto primitive objects. Since, mathematically, there are always more functions than primitive objects, the nominalization function can map only a subset of the functions onto primitive objects.

Such an account, however, faces the concept-horse problem—as does any account that reifies the semantic role of predicates and introduces a distinction between such denotations and "objects of reference" (thus we would get "the function denoted by *p* is not a function"). The problem does not arise for the present account for several reasons. First, neither *to be nice* nor *the property of being self-identical* is taken to refer to a function. *To be nice* plurally refers to states, and *the property of being self-identical* refers to a property not conceived as a function (see Chapter 1). Thus, there is no need to reify functions. Furthermore, the semantic role of predicates is not considered that of standing for an entity, a function, available for reference by a referential term.

However, if the copula demands that the complement have a predicative function, this function should play a role within the complex predicate consisting of copula and complement. This semantic function would be more transparently displayed by an analysis of the copula–predicate relation on which the copula is taken to act as a temporal operator shifting the index of evaluation of the predicative complement, as roughly below:

(33) $[\textit{remain a lawyer}] = \lambda t\ \lambda d[\forall t'(t' < t \rightarrow \text{lawyer}_{t'}(d)) \ \&\ \text{lawyer}_{t}(d)]$

That is, the copula verb would be considered a syncategorematic expression.[10] Note that this does not require it to be treated as an index-shifting operator, just as modal

[10] The distinction between syncategorematic and categorematic expressions is a very old one going back at least to medieval times (where it seemed to have played a central role in philosophical discussions about language). Modern semantics tends to blur the distinction because of the dominating type-theoretic outlook.

The distinction, however, seems to have a correlate in the more recent generative syntactic literature. Within generative syntax, generally a distinction has been made between functional and lexical heads. Auxiliaries are functional heads dominated by I, whereas verbs like *remain* or *see* are lexical heads headed

operators need not be treated as quantifiers ranging over possible worlds. On a modalist view, they act as primitives, subject only to general conditions governing their inferential behavior (see, for instance, Forbes 1985).

2. The Nominalization Theory of special quantifiers

We can now turn to the Nominalization Theory of special pro-predicative quantifiers. Let me first summarize the situation we have arrived at. Special pro-predicative quantifiers must be objectual, but what they range over cannot be concepts (as opposed to objects), nor can it be objects that are properties. What kinds of entities special quantifiers range over is revealed by the sorts of predicates that can be the restrictions of those quantifiers. Special pro-predicative quantifiers range over entities that can have perceptual and causal properties and are evaluated in a way that is distinct from the way abstract property objects are evaluated. The kinds of entities that meet these conditions are just the kinds of entities that corresponding nominalizations refer to. More precisely, special pro-predicative quantifiers range over objects that would be referents of nominalizations of predicates whose place the quantifiers take. These nominalizations would be either nominalizations that refer to specific tropes, as in (34) and (35), or nominalizations that stand for kinds of tropes, as in (36) and (37):

(34) a. John is something Mary never imagined, namely wise.
b. Mary never imagined John's wisdom.

(35) a. John has become something Mary never thought possible, namely very athletic.
b. Mary never thought John's athleticism possible.

(36) a. John is everything Mary despises, dishonest, unhelpful, and immodest.
b. Mary despises dishonesty, unhelpfulness, and immodesty.

(37) a. John has become everything Bill aspires to, wise, diligent, and excellent.
b. Bill aspires to wisdom, diligence, and excellence.

by V. It is sometimes assumed that the distinction between the two consists in that only lexical heads assign theta roles, whereas functional heads do not. Clearly, many lexical heads can take non-referential complements and thus would not assign a theta role to it. The status of an expression as syncategorematic clearly is not limited to functional heads in the sense of generative syntax.

The possibility of predicates and complement together having a syncategorematic meaning also undermines the notion of semantic selection as independent of syntactic selection in the generative syntactic literature (cf. Grimshaw 1979). Semantic selection consists in what kinds of objects a predicate requires, whereas syntactic selection consists in what kinds of syntactic categories a predicate requires its complements to be of. Grimshaw argued that the two requirements are independent of each other. Pesetsky (1982) argued that syntactic selection could be reduced to case assignment, leaving semantic selection as the only requirement to be specified by the lexicon. However, for syncategorematic constructions, the syntactic category of a complement is semantically significant, rather than just required for formal reasons.

Tropes as well as kinds of tropes are also of course suitable arguments of perceptual and causal predicates.

The way evaluative predicates are understood supports the view that special pro-predicative quantifiers may range over kinds of tropes. Consider (38) and (39):

(38) a. John is something admirable, namely wise.
b. Wisdom is admirable.
c. ?? The property of being wise is admirable.

(39) a. John is something nice, namely generous.
b. Generosity is nice.
c. ?? The property of being generous is nice.

In (38a), *admirable* is not predicated of the property of being wise, and also in (39a), *nice* is not predicated of the property of being generous. Rather what *admirable* is predicated of in (38a) is wisdom, and what *nice* in (39a) is predicated of is generosity, that is, generous behavior or the manifestation of the property of being generous in human activities. Note that (39a) does not even allow for a reading on which *nice* would be predicated of "the property of being generous."

If pro-predicative quantifiers range over tropes or kinds of tropes, they should admit just the kinds of predicates that are acceptable with tropes or kinds of tropes. We have seen that this is the case for perceptual and causal predicates as well as predicates of evaluation (and also the attitudinal predicates in (34)–(36)). But tropes should also accept predicates of description and of extent. However, those predicates do not behave as expected. Recall that such predicates are applicable to tropes, but not to states:

(40) a. ?? John described Mary's being very beautiful.
b. John described Mary's great beauty.

(41) a. ? John's being wise is greater than Bill's being wise.
b. John's wisdom is greater than Bill's.

What is puzzling is that in relative clauses restricting pro-predicative special quantifiers, predicates of description and of extent are unacceptable:

(42) a. ??? Mary became something that is difficult to describe, namely very beautiful.
b. ??? What Mary is is hard to describe; namely she is very beautiful.
c. ??? What John became exceeds what Joe became (John became more athletic than Joe).
d. ??? John became something that is greater than what Mary became.

One might take this to be evidence that pro-predicative special quantifiers stand for states, rather than tropes (as I did in Moltmann 2003b). However, there are reasons to

maintain the trope-quantificational view for pro-predicative special quantifiers. First, there are special quantifiers that clearly must range over tropes and in fact allow for predicates of description and extent, namely special quantifiers with *how* and *way*:

(43) a. The way John behaves is difficult to describe—John behaves very unusually.
b. The way John has improved exceeds the way Bill has improved.

Second, predicates of evaluation (of quality, not of extent) behave with special quantifiers as they do with trope terms, not with state terms:

(44) a. John is something Mary admires.
b. Mary admires wisdom/John's wisdom.
c. ?? Mary admires John's being wise.

The way *admires* in (44a) is understood corresponds to the way it is understood in (44b), not to the way it is understood in (44c).

Thus, some special quantifiers certainly do quantify over tropes or kinds of tropes. Therefore, a different explanation is needed for why predicates of extent and of evaluation of extent are impossible with special quantifiers.

The reason why special quantifiers with *–thing* do not allow for predicates of description and extent is, it appears, that such predicates care about the particular way reference is made to the entity to which they apply. Thus, (45a) and (45b) mean different things even if the subjects of the two sentences refer to the same entities; and so for (46a) and (46b):

(45) a. John's wisdom is hard to describe.
b. John's quality is hard to describe.

(46) a. John's wisdom is greater than Bill's.
b. John's quality is greater than Bill's.

Referring to a trope in an unspecific way, by using a term like *John's quality* or the quantifier *something*, triggers a different understanding of a predicate of description than describing the particular kind of trope, as with the term *John's wisdom*. Similarly, predicates of extent cannot easily be applied to a trope referred to unspecifically, as with *John's quality*, but only when the trope is referred to specifically, using a nominalization derived from a gradable adjective, such as *John's wisdom*.

The same observations in fact can be made with specific as opposed to unspecific descriptions of objects:

(47) a. The book John bought is difficult to describe.
b. The object John bought is difficult to describe.

(48) a. The book John bought is more interesting than the book Bill bought.
b. The object John bought is more interesting than the object Bill bought.

In (47a) and (48a) the predicate focuses on the kind of book that is its argument, whereas in (47b) and (48b) it focuses on the kind of object that is its argument, and that while the arguments may be the very same.

Let us then turn to pro-predicative quantifiers when they range over kinds of tropes. It is expected that four classes of predicates characteristic of kinds of tropes should be acceptable with those quantifiers. We have already seen that evaluative predicates are acceptable. Recall that evaluative predicates classify as characterizing (individual-level) predicates and thus apply to the various instances of the kind generically. Instance-distribution predicates as well as some intensional predicates are fine too:[11]

(49) a. John has become something that is very rare, namely a world-class chess player.
b. John has become something Mary also aspired to, namely a world-class chess player.

To summarize, the entities pro-predicative quantifiers range over behave like tropes or kinds of tropes with respect to different classes of predicates applicable to tropes or kinds of tropes.

We can now give a formal semantic analysis of pro-predicative special quantifiers. Pro-predicative special quantifiers always relate to a predicative syntactic position and they may in addition relate to a referential syntactic position. On the Nominalization Theory of special quantifiers, special quantifiers perform two functions simultaneously: they nominalize and they quantify or refer. They nominalize with respect to the predicative syntactic position and they introduce objects that will form the quantification domain and may fill in the referential positions the quantifier relates to. Special quantifiers thus enter an additional syntactic relation besides the syntactic relation to a scope and to a variable they bind. Special quantifiers in addition enter a syntactic relation to what I will call a *nominalization domain*, which will form the point of departure for the semantic nominalization operation. The nominalization domain will contain a trace of the quantifier with which it will be co-indexed. The quantifier itself will be co-indexed with another index, an index assigned to the nominalization domain. Thus, the Logical Form of (50a) will be as in (50b).[12]

[11] In general, episodic predicates and some intensional verbs are significantly worse with pro-predicative quantifiers than with explicit trope-referring terms:

(i) a. ? John has become something that I have never encountered before, namely extremely wise.
b. ?? John is something Mary has found too, namely happy.
(meaning: "John is happy and Mary has found happiness")
c. ?? John has become something Mary is looking for too, namely very happy.

It remains to be explained why such predicates behave differently.

[12] In Moltmann (2003b), I attributed the nominalizing function of special quantifiers to the morpheme *-thing* and their quantificational or referential function to the quantificational morpheme (*some-, no-, every-* etc.). The proposal was as follows. When a special quantifier replaces a non-referential complement, the morpheme-*thing* will move and adjoin to the verb, forming a unit with it. That is, *-thing* will be incorporated at the level of Logical Form, where Logical Form is understood in the sense of generative grammar, as the

(50) a. John became something admirable.
b. John [something admirable]$_i$ [became [$_{ik}$ t_k]]

Pro-predicative quantifiers, as Williams (1983) has noted, always take narrow scope with respect to the subject. Thus, *everything* below cannot take scope over *some student*:

(51) Some student is everything that Mary is.

Therefore, I will take the scope of *something* to be just the VP, rather than the entire sentence.

The nominalization domain of a special quantifier will be interpreted as the set of entities over which the special quantifier ranges. In (50a), the nominalization domain is just the trace left by the quantifier. In later chapters, we will see that the nominalization domain may be greater than that, including, in particular, the verb or a lexical part of it as well.

For pro-predicative quantifiers, the quantification domain consists of tropes or kinds of tropes. How are such entities obtained from a trace in predicate position that the quantifier leaves behind? The nominalization function might operate on a predicative complement the quantifier could replace. However, this carries the same problem of expressibility that is the mark of substitutional quantification. The tropes or kinds of tropes that the special quantifier ranges over include those for which there is no predicative expression. However, for special pro-predicative quantifiers there is a simple alternative account available. Given that possible adjective meanings are functions from possible worlds and times to relations between tropes and individuals, the nominalization functions associated with pro-predicative special quantifiers can operate directly on functions from circumstances to relations among individuals and tropes.

syntactic representation of a sentence that is input to semantic interpretation and possibly distinct from the sentence's surface form. Syntacticians generally take incorporation to involve head movement, that is, movement in which a lexical category moves to a sufficiently close head in a higher position and adjoins to it. Overt incorporation of a noun into the verb can be found across many languages (cf. Baker 1988). However, it has also been advocated as an operation at logical form only (for example by van Geenhoven 1998). With incorporation of *-thing* into the verb, the representation of (ia) will be as in (ib):

(i) a. John remained something admirable.
b. John[thing[remained]$_V$]$_V$ [some [e]$_N$ admirable]]$_{NP}$

The complex predicate *thing-remained* will then be interpreted either as a relation between individuals and tropes or kinds of tropes, as below:

(ii) a. [*thing*$_1$*-remain*] = λx λy[∃W(W ∈ Pred(ENGL) & [*remain* W](x) & y = S(x, W))]
b. [*thing*$_2$*-remain*] = λx λy[∃W(W ∈ Pred(ENGL) & [*remain* W](x) & y = S_k(W))]

However, the problem is that the movement that *-thing* would undergo does not obey conditions on head movement: *-thing* is not the head, rather *every* is.

Another problem for the account is that it very often has to posit implicit occurrences of an abstract morpheme -THING as in (iiib) for (iiia):

(iii) a. John remained what Mary is.
b. John THING-remained [what Mary THING-is e]

For this reason, the analysis in terms of ordinary quantifier raising and assignment of both scope and nominalization domain is to be preferred.

One nominalization function, the one that will yield particular tropes, will apply to such a function and just yield a relation between individuals and tropes. The other nominalization function will operate on the same function and will make available the entire range of tropes for quantification over kinds of tropes.

I will follow the type-theoretic approach in construing the copula as expressing a relation between individuals and possible adjective meanings, that is, functions from circumstances to relations between tropes and individuals. However, as in type theory this is to be understood as meaning simply that the second argument of the relation expressed by the copula represents the semantic role of a possible predicative complement, rather than acting as an object standing in a relation.

The nominalization domain will be interpreted as a relation between individuals and tropes when the particular trope interpretation is at stake, as in (52a), where "C" ranges over (one-place) adjectival concepts:

(52) a. $[_{ki}$ *became* $t_i] = \lambda i\, \lambda x\, \lambda d[\exists C(\text{become}_i(d, C)\ \&\ x = f_1(C, i, d))]$
b. $f_1(C, i, d) = \max x[C_i(x, d)]$
c. [*something admirable*] $= \lambda i\, \lambda x[\exists x(\text{admirable}_i(x)\ \&\ X_i(x))]$
d. [*something admirable*$_1$] $[_{ki}$ *became* $t_i]) = \lambda i\, \lambda d[\exists x(\text{admirable}_i(x)\ \&$ $\exists C(\text{become}_i(d, C)\ \&\ x = f_1(C, i, d)))]$

However, it will be interpreted as a relation between individuals and pluralities of tropes on the kind interpretation, by using in place of f_1 the function f_2 below, which maps possible adjective meanings to modalized pluralities:

(53) $f_2(C) = \max xx[\exists i\ \exists d\ C_i(xx, d)]$

More complicated is the analysis of a sentence involving two nominalization domains, such as (54a), which will have the Logical Form in (54b):

(54) a. John became something Mary is too.
b. John something$_i$ $[O_j$ Mary $[_{jk}$ is t too]] $[_{ik}$ became $t_i]$.

Here *something* has as its nominalization domain [*become* t], but it also has a restriction *that Mary is t too*, which involves itself a relative-clause operator that has its own nominalization domain, namely [*is* t *too*]. That the relative-clause operator acts as a nominalizing operator is plausible given the reasonable assumption that it inherits (optionally) a nominalization feature from the quantifier *something* whose restriction it forms. Thus, the interpretation of (54a) will be as in (55c), based on the interpretations of the nominalization domains in (55a) and (55b):

(55) a. [*became* t] $= \lambda i\, \lambda x\, \lambda d[\exists C(\text{become}_i(d, C)\ \&\ x = f_2(C))]$
b. $[O_j$ *Mary* $[_{jk}$ *is* $t_k]] = \lambda i\, \lambda x[\exists C(\text{is}_i(\text{Mary}, C)\ \&\ x = f_2(C))]$
c. $\exists d([\textit{Mary is } t]_i(d)\ \&\ \exists C(\text{become}_i(\text{John}, C)\ \&\ d = f_2(C)))$

3. Special nouns

Special quantifiers formed with *-thing* as well as the pronouns *what* and *that* are not the only special quantifiers in English. There are other special quantifiers, or better special NPs.

As mentioned, the morpheme *way* may form special quantifiers. Such quantifiers can take the place of adverbials:[13]

(56) a. John walks the same way as Mary.
b. John works in a way that I do not understand.

Special quantifiers with *way* range over higher-level tropes, that is, tropes of tropes (which, recall from Chapter 2, include tropes of events). They carry a sortal restriction to higher-level tropes. Special NPs with *way* allow for the range of predicates naturally considered predicates of tropes of events, including evaluative and causal predicates, and they enter the relevant sorts of similarity relations to other tropes of events, as expressed by *is the same as*:

(57) a. The way John works is unusual/is the cause of the delay.
b. The way John works is almost the same as the way Mary works.

Special quantifiers need to be distinguished from ordinary NPs with a trope-referring noun as head. The noun *manner* appears to form such NPs, but not special quantifiers. An NP with *manner* as head cannot as such occupy an adverbial position, but requires a preposition:

(58) John works *(in) the same manner.

Special NPs also need to be distinguished from indexical adverbials or predicates that do not introduce an entity available for predication. An example is *somehow*:[14]

(59) a. John did it somehow.
b. * John did it somehow strange/somehow that I do not understand.

Somehow involves quantification over tropes, but not in a way that would make them available in the semantic structure for predication by adjectives or relative clauses.[15]

[13] Copula verbs allow both for special quantifiers with *-thing* and with *way/how*:

(i) a. John is something, namely a teacher.
b. John is always the same way.

However, there are differences: whereas *something* in (ia) stands for a quality of John, *the same way* in (ib) stands for a quality of John's behavior. (ib) is in fact understood like (ii):

(ii) John behaves that way.

[14] *Somewhere* is different from *somehow*. English *somewhere* does allow for predicates predicated of a location:

(i) John lives somewhere nice/somewhere I cannot remember.

[15] *Somehow* behaves in that respect like type demonstratives such as *thus* or *so*, which do not introduce an entity available for predication either.

Some way as in (60a) will also take a scope and a nominalization domain, the VP, as in (60b):

(60) a. John sleeps some way.
b. some way$_i$ John [$_{ik}$ sleeps t_k]

The interpretation of the Logical Form in (60b) will be similar to that of a sentence with a pro-predicative quantifier, as in (60c):

(60) c. $\exists x(\text{way}(x) \,\&\, \exists R\, \exists e\, \exists x'(\text{sleep}(e, j) \,\&\, B(e, x') \,\&\, x = f_1(e, \lambda x'[R(e, x')]))$
d. $f_2(R) = \max xx[\exists i \exists e\, R_i(e, xx))]$

Aside from special pro-predicative quantifiers, there are certain other NPs in English that can replace predicative complements without leading to the Objectivization Effect. These NPs contain certain *special nouns* as head.[16] In English, special nouns include *kind, color, size, shape*, and *height*, as in the following examples:

(61) a. John's house is red.
b. Mary's house is the same color.

(62) a. The shirt became much smaller.
b. The shirt became the same size as the other one.

(63) a. The vase is cylindrical.
b. That vase is the same shape.

(64) a. John is ten feet tall.
b. John is the same height as Mary.

I will call noun phrases with a special noun as head *special full noun phrases*.

Whether or not a noun can act as a special noun cannot be a matter of its lexical meaning as such, but rather must be a matter of lexical particuliarity. Languages differ greatly regarding which nouns can be used as special nouns and which ones cannot. Thus *shape* in German is not a special noun, (* *Die Kiste ist dieselbe Form* "the box is the same shape"), and *color* is not in Italian (* *la casa est la stessa colore* "the house is the same color").

In English, also the *kind-of* construction leads to special full NPs:

(65) a. The house is brown-red
b. That house is the same kind of color.

(66) a. The container is cylindrical.
b. The other container is the same kind of shape.

[16] The observation that NPs of this sort can replace predicative complements has been made by Williams (1983).

Special nouns, it appears, are always nouns that allow for modalized plural reference with definite NPs, showing the characteristic kind term behavior:

(67) a. This color/size/shape is rare.
b. Mary has never seen this color/size/shape.
c. This color/size/shape is nice.
d. Mary needs this color/size/shape.

This color, this size, or *this shape* are terms that stand for kinds of tropes. They do not stand for particular tropes. Rather, it is the relational form as in *the color of the house* and *the shape of the box* that forms NPs standing for a particular trope (cf. Chapter 2).

Not all definite NPs that allow for modalized plural reference can act as special noun phrases. German displays the same evidence for modalized plural reference with NPs with *Form* "shape" as head, as in (68a), but they do not form special noun phrases, as seen in (68b):

(68) a. Diese Form ist selten.
"This shape is rare."
b. Die Vase ist ??? dieselbe Form/ok von derselben Form.
"The vase is the same shape/of the same shape."

Allowing for modalized plural reference appears to be a necessary, but not a sufficient, condition for being a special noun.

Special full NPs can be analyzed just like special quantifiers, taking a scope as well as a nominalization domain. However, what distinguishes them from special quantifiers is that they involve a particular restriction to certain kinds of tropes. *Some color* ranges only over color tropes, and *some shape* only over shape tropes. Thus, the content of the head noun acts as a restriction of the quantifier ranging over kinds of tropes, as in the analysis below:

(69) a. The house is some color.
b. The house [some $color_i$] [$_{ik}$ is t_k]
c. [*is t*] = $\lambda i\, \lambda xx\, \lambda d[\exists C(is_i(d, C) \,\&\, xx = f_2(C))]$
d. [*some color*$_i$] [$_{ik}$ *is* t_k] = $\lambda i\, \lambda d[\exists xx(color_i(xx) \,\&\, \exists C(is_i(d, C) \,\&\, xx = f_2(C)))]$

4. Conclusion

In this chapter, I have argued that quantification into predicate position in natural language should be understood as a form of nominalization. Only certain kinds of quantifiers can replace predicates in natural language, namely special quantifiers, and these quantifiers must be understood objectually, not substitutionally or in terms of their inferential potential. The kinds of entities that special quantifiers range over have, with one exception, just the kinds of properties that tropes or kinds of tropes have. The one exception, predicates of description and extent, do not apply with special

quantifiers as with explicit trope-referring terms because such predicates always require a particular kind of descriptive content of the term used to refer to their arguments.

The nominalizing pro-predicative function of special quantifiers is only one of a range of nominalizing functions that special quantifiers can have. Another function, the one of replacing a plurally referring term and reifying a plurality as a single entity, was already discussed in Chapter 1. In the next chapter, we will discuss another important nominalizing function of special quantifiers; that of taking the place of clausal complements and introducing proposition-like objects for their domain of quantification.

4

Propositions and Attitudinal Objects

Propositions are abstract objects that play a particularly important role in contemporary philosophy of language. Propositions generally are considered mind- and language-independent objects that act as the primary bearers of truth and falsehood. The motivation for propositions comes from the various roles propositions are taken to play in the context of both language and mind, and it is these roles that impose the particular way in which propositions have been conceived, namely either as sets of truth-supporting circumstances or as structured propositions, configurations consisting of properties and objects (or meanings).

One of the most important roles of propositions is that of being the objects of propositional attitudes, such as belief, desire, and imagination, as well as the contents of speech acts, such as assertions and requests. The most common view, in both the philosophy of language and the philosophy of mind, is that propositional attitudes are relations between agents and propositions. Similarly, illocutionary acts are generally taken to involve both an agent and a proposition. Let me call this *the standard view*. This view appears to correspond to the linguistic form of attitude and speech act reports:

(1) a. John thought that Mary likes Bill.
b. John said that Mary likes Bill.

Thus, the *that*-clause is taken to stand for a proposition and the attitude verb to express a relation between agents and propositions.

The view about the role of propositions in propositional attitudes and speech acts goes along with a second important role of propositions: propositions are generally taken to act as the meanings or referents of sentences, both independent and embedded, such as the *that*-clauses in (1a, b).

The view also goes along with a third role of propositions, namely that of being the values of pro-sentential quantifiers such as *something*, that is, special quantifiers which occur in the place of *that*-clauses, as in (2a) and (2b), which are valid inferences from (1a) and (1b) respectively:

(2) a. John thought something.
b. John said something.

The view that special quantifiers such as *something* in the position of clausal complements range over propositions is generally considered inevitable (at least once a substitutional analysis of such quantifiers has been rejected).

Pro-sentential special quantifiers also display other important properties of propositions, such as their ability to bear truth values, as in (3), and their mind-independence and language-independence, as in the valid inference in (4) (assuming that John and Bill do not speak the same language):

(3) John said something that is true.

(4) John thinks that S.
Bill thinks that S.
John and Bill think the same thing.

If for these reasons propositions are attributed a central status in the semantics of natural language, propositions viewed as objects also carry a range of serious conceptual and empirical problems, as has been pointed out in some of the more recent philosophical literature.

In this chapter, I would like to show that propositions do not in fact play the role of objects of reference as the standard view maintains. *That*-clauses, I will argue, do not act as proposition-referring terms; in fact, they do not act as referential terms at all. Moreover, I will argue that special quantifiers taking the place of *that*-clauses do not range over propositions.

Propositions may be the referents of explicit proposition-referring terms such as *the proposition that* S, but what plays a more important role in the semantics of natural language are entities that I will call *attitudinal objects*. Attitudinal objects are for example "John's thought that S," "John's imagination that S," or "John's hope that S." They also include illocutionary objects of the sort "John's claim that S" and "John's question whether S." Attitudinal objects are not propositions in the sense of mind-independent, abstract objects. Rather they are concrete entities that depend on a particular intentional act and a particular agent. Yet like propositions, they have truth conditions or more generally satisfaction conditions (in the case of a desire, a hope, or a request, for example). Attitudinal objects are the referents of nominalizations of the sort *John's thought that* S, *John's hope that* S, or *John's imagination that* S. To clarify our intuitions about attitudinal objects, it will in fact suffice to pay close attention to the semantic behavior of such nominalizations.

There are also corresponding nominalizations for *kinds* of attitudinal objects, such as *the thought that* S, *the hope that* S, and *the imagination that* S. Kinds of attitudinal objects have as their instances particular attitudinal objects. Unlike the latter, kinds of attitudinal objects can be shared by different agents.

Attitudinal objects and kinds of attitudinal objects are not only the referents of certain de-verbal nominalizations. A closer look at the properties of special quantifiers in place of *that*-clause complements of attitude verbs indicates that special quantifiers in

fact range over attitudinal objects or kinds of them, rather than propositions. This constitutes an important further piece of support for the Nominalization Theory of special quantifiers.

Attitudinal objects as entities are distinct from events, even though they bear all the features of concreteness of events and may be spatio-temporally coincident with mental events or speech acts. What distinguishes attitudinal objects from events is, most importantly, their ability to bear truth or satisfaction conditions as well as the particular way they enter similarity relations to each other. I will argue that attitudinal objects are best conceived of as tropes of a particular complex sort. While events themselves may be viewed as tropes, events need to be viewed as complex tropes of a very different sort.

Attitudinal objects arguably also act as the primary bearers of truth and falsehood and should in general take the place of propositions. However, pursuing an approach to sentence meaning and clausal complements based on attitudinal objects will go far beyond the scope of this book. I will rather restrict myself to focusing on the ontology of attitudinal objects, their status as being introduced by nominalizations, and a sketch of the semantics of *that*-clauses that naturally goes along with them. The latter will consist in a neo-Russellian account of attitude reports, which is based on an intentional notion of predication.

I will first discuss the standard notion of a proposition together with the Relational Analysis of attitude reports. After pointing out the conceptual and empirical problems for propositions, I will turn to a range of arguments in favor of attitudinal objects and present a neo-Russellian analysis of attitude reports that goes along with the notion of an attitudinal object. Finally, I discuss some similarities between measure constructions and attitude reports and their implications, in particular in view of the Measurement Theory of propositional attitudes (Matthews 2007).

1. Semantic motivations for propositions and the Relational Analysis of attitude reports

The notion of a proposition itself goes along with a particular semantic account of attitude reports and with a particular view of the nature of propositional attitudes. The latter is the view that propositional attitudes are relations between agents and propositions. This view seems to be reflected in the linguistic form of attitude reports. Thus, attitude reports such as (5a) seem to have the same logical form as sentences with noun phrases acting as ordinary singular terms such as (5b), and quantification over both sorts of objects seems possible in the same way as well, as in the inferences from (5a) and (5b) to (6a) and (6b) respectively:

(5) a. John believes that Mary is happy.
b. John likes the book.

(6) a. John believes something.
b. John likes something.

In (5a) and (5b), the clause *that Mary is happy* and the noun phrase *the book* seem to stand for entities—propositions in the first case and objects in the second case—which function as arguments of the relations expressed by the verbs *believe* and *like*. I will call the view that takes clausal complements and the embedding attitude verbs to play those semantic roles the *Relational Analysis*. In its most general form (as far as it is relevant for the purpose of our discussion), the Relational Analysis is based on the following two assumptions:[1]

(7) The Relational Analysis of attitude reports
[1] A *that*-clause embedded under an attitude verb stands for a proposition that acts as an argument of the attitude verb.
[2] An attitude verb taking a *that*-clause as complement expresses a relation between agents and propositions.

On the Relational Analysis, (5a) will have the logical form given in (8), where [*that Mary is happy*], the denotation of *that Mary is happy*, is the proposition that Mary is happy:

(8) believe(John, [*that Mary is happy*])

On the Relational Analysis, moreover, special quantifiers are naturally considered objectual quantifiers ranging over propositions.

There is another version of the Relational Analysis, which I will call *the Modified Relational Analysis*. On that version, the arguments of a *that*-clause-taking attitude verb need not all be propositions, but may be other, proposition-like objects of various sorts, such as facts and possibilities.[2] This would account for the observation that some attitude verbs do not allow for an inference such as from (9a) to (9b), whereas others allow for inferences such as from (10a) to (10b) or (11a) to (11b):

(9) a. John believes that S.
b. John believes the proposition that S.

(10) a. John noticed that S.
b. John noticed the fact that S/??? the proposition that S.

(11) a. John imagines that S.
b. John imagines the possibility that S/??? the proposition that S/??? the fact that S.

[1] There are also variants of the Relational Analysis on which attitude verbs take natural language sentences or sentences of a language of thought as arguments. What follows more or less holds for these views as well, though I will restrict myself to the view on which *that*-clauses stand for propositions.

[2] Such an analysis makes sense, of course, only if propositions are ontologically distinguished from facts and possibilities. For an ontological distinction between facts and true propositions, see Vendler (1972), Fine (1982a), and Asher (1993).

On the Modified Relational Analysis, *believe* takes propositions as arguments, but *notice* facts, and *imagine* possibilities. The Modified Relational Analysis will also play an important role in the discussion to follow. One major problem for the Relational Analysis and the Modified Relational Analysis will be that inferences such as those in (9)–(11) are not generally valid.

2. Conceptual problems for propositions

The standard notion of a proposition is that of a mind- and language-independent object that has truth conditions essentially. Two kinds of conceptions of propositions have been most influential. On the first conceptions, propositions are sets of circumstances (possible worlds or situations) in which the proposition is true, or equivalently functions from circumstances to truth values, mapping a circumstance to the truth value true just in case the proposition is true in that circumstance. On the second conception, propositions are structured propositions, which are most often taken to be sequences of the meanings of elementary constituents, such as concepts or properties and individuals. In a simple case, a structured proposition is a sequence like <LIKE, Mary, Bill> for the sentence *Mary likes Bill*. A more refined version might add modes of presentation m_1 and m_2 for John and Mary as constituents of a structured proposition, yielding a proposition of the sort <LIKE, <Mary, m_1>, <Bill, m_2>> (Schiffer 1987).[3] The first conception is associated with notorious problems in that it identifies propositions that are necessarily true or necessarily false.[4] The second conception avoids such problems by reflecting (to an extent) in the meaning of the sentence itself the syntactic structure of the sentence as well as the way the truth value of the sentence is compositionally obtained.[5]

There is a range of problems for both conceptions, however, that have been discussed in the philosophical literature, in particular by Jubien (2001) and more recently Soames (2010). Let me only briefly mention those problems without going into an in-depth discussion. The first problem is the *problem of arbitrary identification* (see also Moore 1999). This is a problem familiar from Benacerraf's (1965) discussion of natural numbers in the context of the philosophy of mathematics. The problem consists in that the choice of a formal object to be identified with a proposition is, to an extent, arbitrary. The problem arises for the first as for the second conception of

[3] For the individuation of attitudinal objects, the actual modes of presentation need not matter, but rather only the objects themselves. This is the case in (i), given that John and his son will have different modes of presentation of the numbers five and ten (cf. Schiffer 1990):

(i) John believes what his five-year-old son believes, namely that five plus five is ten.

[4] See Soames (2010) for a recent critique of that view.

[5] There is a third conception of propositions, namely as primitives. On Thomason's (1980) account, propositions taken as primitives are the basis for construing properties (as functions from individuals to propositions). On Bealer's (1982) account, primitive propositions are algebraically related to properties and their arguments as well as to other propositions.

propositions. Given the first conception, nothing in the general conditions that propositions need to fulfill could decide between identifying propositions as sets of circumstances or as functions from circumstances to truth values. Given the second conception, the problem is that a proposition such as, for example, the proposition that John is happy could be represented either as <HAPPY, John> or as <John, HAPPY>, the choice between which appears arbitrary: either pair could fulfill the relevant conditions.

Two further, related problems arise for structured propositions. One of them concerns the *truth-directedness* of propositions. The problem is that nothing in a mere sequence of entities could qualify it as a bearer of truth or falsehood. However, propositions were meant to be entities that have their truth conditions essentially. The second problem is known as *the problem of the unity of propositions*.[6] The problem arises specifically for the structured-propositions conception of propositions. It is the problem of what distinguishes a mere sequence of properties and objects from a proposition, an entity with particular truth conditions. The problem of the unity of propositions, like the problem of the truth-directedness of propositions, is a problem of the interpretation of a structured proposition, namely how to interpret the relation among the propositional constituents. A structured proposition simply does not have inherent truth conditions; rather the truth conditions of the structured proposition need to be externally imposed.

Thus, there are fundamental problems with propositions when they are identified with abstract formal objects of whatever sort. The problem would not go away if a proposition was not actually identified with a formal object, but just taken to be represented by it and the formal object considered a "model" for the proposition. A model of an object should allow deriving the essential properties of the object. The truth-directedness and truth conditions of a proposition are part of the proposition's essential properties, but they could not possibly be derived from the kinds of entities proposed as structured propositions.

3. Empirical problems for propositions

3.1. The Substitution Problem

The Relational Analysis of attitude reports gives rise to two problems: the *Substitution Problem* and the *Objectivization Effect*, as I will call them. The substitution problem is the following. If *that*-clauses denote propositions, then they should share their denotations with NPs of the sort *the proposition that* S (at least given a philosopher's use of *proposition* aimed at describing the kinds of things denoted by *that*-clauses). However, it is not generally possible to replace a *that*-clause by *the proposition that* S (for philosophers and non-philosophers alike).[7] There are in fact only very few verbs that allow for a

[6] See Gaskin (2008) for a recent discussion of the problem, also in its historical context.

[7] This observation has first been made by Prior (1971) and again more recently by Asher (1987) and Bach (1997).

replacement of a *that*-clause complement by *the proposition that* S. The list more or less consists of *believe, prove, infer, accept, assume, establish*, and *assert*. Thus, even though the inference in (12a) is valid, the ones in (12b–d) are not:[8]

(12) a. John believes/proves/infers/accepts/assumes/establishes/asserts that S.
John believes/proves/infers/accepts/assumes/establishes/asserts the proposition that S.
b. John thought that S.
John thought the proposition that S.
c. John wishes that he will win.
John wishes the proposition that he will win.
d. John hopes that S.
John hopes the proposition that S.

In fact, the conclusions of (12b–d) are semantically unacceptable.

In contrast to *that*-clauses, referential noun phrases allow for unlimited substitution in extensional contexts. If a particular tree is the referent of the utterance of *the tree*, then the inference below is valid for any predicate *P* that holds only of the tree:

(13) John saw the tree.
John saw the P.

The conclusion of (13) is acceptable (if perhaps pragmatically deviant) even with P being *is the referent of the utterance of "the tree."*

The reason why *the proposition that* S in the conclusions of (12b–d) is unacceptable cannot be a syntactic one, such as that the predicates would not admit NP complements. The same predicates do allow for special quantifiers and pronouns, expressions that behave like NPs in all purely syntactic respects:

(14) John thought/wishes/hopes something.

There are, however, attitude verbs that take *that*-clause complements, but resist any NP complement whatsoever, including special quantifiers. These include *remark, complain, care*, and *reason*:[9]

(15) a. John remarked/complained/cared/reasoned that S.
b. * John remarked/complained/cared/reasoned something.

[8] Note that these intuitions hold with whatever special meaning the speaker might have in mind when using the word *proposition*. They hold when *proposition* is used in what seems to be the colloquial sense, describing a content that has been maintained by someone to be true; and they hold when *proposition* is used in a technical philosopher's or semanticist's sense, referring to whatever the semantic content of a *that*-clause is or is taken to be.

[9] In the case of *complain* and *care*, the insertion of the preposition "about" makes the b-examples acceptable, but not so in the case of *remark* and *reason*.

However such syntactic resistance to NP complements is to be accounted for, this class of verbs needs to be sharply distinguished from the one giving rise to the semantic substitution problem illustrated in (12b–d).

Sometimes *that*-clauses can be replaced by full NPs other than *the proposition that* S. For example, past-oriented factive verbs such as *remember* generally allow for a replacement by *the fact that* S, as in (16a) (but not by *the proposition that* S, with the same reading of the verb). Moreover, negative future-oriented verbs like *fear* (with some effort) tolerate a replacement by *the possibility that* S, as in (16b), but neither by *the proposition that* S nor *the fact that* S, with the same reading of the verb:

(16) a. John remembered that it was raining.
John remembered the fact that it was raining.
b. John fears that it might be raining.
John fears the possibility that it might be raining.

This would motivate the Modified Relational Analysis, the analysis on which *that*-clauses may denote different kinds of proposition-like objects and *that*-clause-taking verbs differ in what kinds of propositional arguments they take: some verbs take propositions, others take facts, and yet others take possibilities as arguments. Setting aside what the differences between propositions, facts, and possibilities may be, the Modified Relational Analysis faces serious difficulties.

First, the Modified Relational Analysis can apply to only some of the cases exhibiting the semantic problem of substitution. Many attitude verbs do not allow any NPs other than special quantifiers to replace the *that*-clause complement. For example, the verbs in (12b-d), *think, wish*, and *hope,* do not allow for a replacement by *the fact that* S*, the possibility that* S, or any other full NP. Other verbs of this type are *conclude* and *imagine*. Not only do these verbs resist nominal constructions of the sort *the proposition that* S, but also most carefully chosen descriptions such as *the object that is also the object of Mary's claim* or most general and "innocent" quantifiers such as *some entity*. Thus, none of the following inferences is valid:

(17) John claimed that S.
John claimed the proposition that S/the content of the sentence S/the object that is also the object of Mary's claim/some entity.

In addition, epistemic factive verbs tend to resist replacement by an ordinary, that is, non-special, NP. Examples are *know, realize, notice*, and *see*. The following inference, to my ears, is hardly acceptable:

(18) John knows that he lost the game.
John knows the fact that he lost the game/some entity.

Special quantifiers and pronouns, though, can replace the clausal complement of those verbs, which means that those verbs do not resist NPs for syntactic reasons:

(19) John claimed/knows something.

The second difficulty for the Modified Relational Analysis is that it will have to deviate significantly from the original Relational Analysis. On the Modified Relational Analysis, *that*-clause complements could not have the semantic role of referential terms, being able to stand for some entity that would be a suitable argument of the embedding predicate. *That*-clauses cannot stand for different kinds of propositional arguments on their own (by either being ambiguous or somehow referring to propositional objects indirectly, via the proposition they refer to directly). Even if the predicate could in principle take different sorts of proposition-like objects as arguments when they are described by full NPs, the predicate determines how a clausal complement is to be understood. This is illustrated by the sentences below:

(20) a. John remembered that Mary has left.
b. John fears that Mary might leave.

The *that*-clause in (20a) can only be understood as standing for the fact, not the proposition or the possibility, that Mary left. Similarly, the *that*-clause in (20b) can only be understood as standing for the possibility, not the proposition, or the fact, that Mary might leave.

This *Unique Determination Property* of clausal complements, as I will call it, means that a *that*-clause stands for a particular kind of propositional object only in the presence of a particular embedding predicate and thus is referentially dependent. The *that*-clause therefore cannot act as an ordinary referential term, as the Modified Relational Analysis would have it.

Possible explanations of the Substitution Problem that might save the Relational Analysis or its modified version do not seem to go very far. First, a purely syntactic explanation is not available, since special quantifiers and pronouns, as mentioned, behave just like ordinary noun phrases in all syntactic respects.

Another explanation might draw an ontological distinction between "contents" on the one hand (denotations of *that*-clauses) and "objects" on the other hand (denotations of noun phrases), a distinction evocative of the Fregean distinction between objects and concepts. On this view, only objects could be referents of ordinary noun phrases, contents by nature eluding any access by description or (ordinary) quantification, since they are tied to the semantic function of a sentence.

One problem for such an explanation is like the one for the distinction between concepts and objects discussed in Chapter 3. If an entity is an argument of a true relation, whatever the category of the expression describing it, then it should be possible to describe that entity or quantify over it by using an ordinary noun phrase. Certainly, a philosopher or linguist appears to be able to refer to a mere content, and

since his descriptive or quantificational means are also part of the object language (or an extension of it), it is hard to see why such reference should fail when the content-referring term acts as a complement of the attitude verb. An ontological distinction between contents and propositional objects is less appealing anyway than the distinction between concepts and objects. The distinction between concepts and objects corresponds to an intuitive distinction between unsaturated and saturated entities, which the distinction between contents and objects lacks.

A potential type-theoretic explanation of the Substitution Problem with *that*-clauses faces the same problems as a type-theoretic explanation of the Substitution Problem with predicative complements discussed in Chapter 3. On a type-theoretic account, as proposed by Rosefeldt (2006), clausal complements and referential NPs, including *the proposition that* S, would be associated with different types: type $<s, t>$ (which corresponds to a denotation that is a function from circumstances to truth values) and type e (which corresponds to a denotation that is an element of the domain of "objects"). Special quantifiers would have to be of the same type as sentences, and predicates would be specified for the type of the arguments they take. *That*-clauses on that account could not be substituted by referential NPs because the embedding verb requires arguments of type $<s, t>$ rather than type e.

The problem with the type-theoretic explanation of the Substitution Problem is that the distinction between the domain of individuals (of type e) and the domain of other types (e.g. type $<s, t>$) simply reflects the role of syntactic categories that take their denotations from those domains in the semantic composition of the sentence. Nothing prevents an expression of type e, that is, a referential NP, from taking an object as its denotation that also happens to be a function in the domain $D_{<s, t>}$. The Substitution Problem, on the type-theoretic account, is simply traced to the fact that some predicates take only sentences or special NPs as complements, but not ordinary NPs.[10]

[10] Schiffer (2003) also suggests a syntactic explanation of the Substitution Problem. Schiffer compares the substitution problem with *that*-clauses to the impossibility of replacing the second NP in a close apposition as in (ia) by a co-referential description as in (ib):

(i) a. The Italian singer Pavarotti never sings Wagner.
b. * The Italian singer the greatest tenor never sings Wagner.

But the reason why substitution is not allowed in (ia) is that the second NP in close apposition is mentioned, rather than used (see Chapter 6). This is not the case for *that*-clause-complements of the relevant attitude verbs. Schiffer also compares the Substitution Problem with *that*-clauses to the impossibility of substitution of near-synonymous verbs in the dative shift construction:

(ii) a. Betty gave the donation her tiara.
b. * Betty donated the donation her tiara.

However, as Schiffer himself notes, this is because certain verbs resist the dative shift construction for formal reasons, reasons that would be irrelevant for constructions with *that*-clauses. Schiffer gives no indication what the formal reasons should be that prevent substitution of *that*-clauses by explicit proposition-referring terms.

3.2. The Objectivization Effect

The second problem for the Relational Analysis, the Objectivization Effect, is related to the first. The Objectivization Effect consists in that in many cases a replacement of a *that*-clause by a noun phrase triggers a different kind of reading of the predicate—and this happens in a way sufficiently systematic for it to be traced to the semantics of the constructions themselves. The invalid inferences below illustrate the Objectivization Effect:

(21) a. John expects that Mary will win.
John expects the proposition that Mary will win.
b. John imagined that Mary was alive.
John imagined the proposition that Mary was alive.
c. John remembers that Mary won.
John remembers the proposition that Mary won.

The invalidity of such inferences indicates that as soon as a clause *that* S is replaced by the construction *the proposition that* S, the content expressed by *S* comes to play a very different role in the meaning of the sentence. The content now plays the same role as ordinary objects acting as arguments of the verb, as in (22):

(22) a. John expects Mary.
b. John imagined Mary.
c. John remembers Mary.

The conclusion of (21a) means that John expects an abstract object (a proposition) and the conclusions of (21b) and (21c) that John's imagination or memory is that of an abstract object, just as (22a), (22b), and (22c) are about Mary. By contrast, the premises of (21a, b, c) report John's expectation, imagination, or memory as being only about Mary.

The fact that S also displays the Objectivization Effect, its value often acting like an object the attitude is directed toward rather than the attitude's content. Thus, the following inference is invalid:

(23) John heard that Mary entered the room.
John heard the fact that Mary entered the room.

The conclusion of (23) could be true only in a metaphysical fantasy in which facts are concrete objects of perception.

The Objectivization Effect cannot simply be traced to the presence of an NP as opposed to a *that*-clause as complement of the attitude verb. This is because the content-related reading is preserved when a special quantifier or pronoun replaces a *that*-clause complement:

(24) a. John expects (imagined/observed/heard/recognized) something.
b. John expects (imagined/observed/heard/recognized) that.

That-clauses and NPs of the sort *the proposition that* S thus display the following fundamental semantic distinction: the semantic value of a *that*-clause in general acts as a mere content of the attitude, whereas the semantic value of an NP like *the proposition that* S generally acts as an object the described propositional attitude is about or directed toward. The corresponding semantic shift that takes place when a *that*-clause is replaced by a non-special NP is what the Objectivization Effect consists in:

(25) The Objectivization Effect
Substitution of a *that*-clause by a (non-special) NP results in a reading the predicate exhibits when taking ordinary objects as arguments, so that in the case of an attitude verb, the complement specifies not the mere content of the attitude, but the object the attitude is about or directed toward.

The Objectivization Effect arises rather systematically with attitude verbs that accept referential complements. The semantic difference between the constructions of nominal and of sentential complementation that underlies it appears part of the knowledge of language of competent speakers and thus needs to be accounted for by a semantic theory. The Objectivization Effect indicates that reporting the mere content of a propositional attitude is precisely the purpose of the sentential construction and, moreover, that the *primary* means for reporting the mere content of a propositional attitude is the sentential construction.[11]

We can thus conclude that the Substitution Problem and the Objectivization Effect are serious problems for the Relational Analysis of attitude reports and the notion of a proposition that goes along with it.

4. Attitudinal objects

Before giving an account of the Substitution Problem and the Objectivization Effect, let me first introduce the notion of an attitudinal object, as a notion to be contrasted with the standard notion of a proposition as well as the more familiar notion of an event or state. While the notion of a proposition naturally goes along with the Relational Analysis of attitude reports, attitudinal objects naturally go along with a non-relational analysis of attitude reports as well as the Nominalization Theory of special quantifiers.

The present section serves to introduce attitudinal objects with their most important properties. Later, I will propose a formal ontological account of attitudinal objects based

[11] King (2007) proposes a syntactic account of the Objectivization Effect. For King, attitude verbs displaying the Objectivization Effect are polysemous: one of their meanings is triggered by CP-complements, the other by NP-complements. This account does not really explain the effect. It simply states what the effect corresponds to syntactically without saying why. Moreover, the syntactic correlation with NP-complements or CP-complements is not really what is at stake, since special quantifiers are also NPs.

on a particular notion of intentional predication, which will play a central role in the non-relational analysis of attitude reports that I will propose.

Attitudinal objects can best be approached by looking more closely at the semantic behavior of the relevant nominalizations referring to them, such as *John's thought that Mary likes Bill, John's claim that Mary likes Bill, John's hope that it will rain*, or *John's imagination of being a king*.

Attitudinal objects in first approximation are entities in between events and propositions. Like propositions, attitudinal objects of the doxastic or assertive sort intuitively have truth conditions:

(26) John's belief/claim is true/false/correct.

Moreover, they may be true even in worlds in which the attitudinal object does not exist:

(27) a. John's thought that S would be true even if he had not thought that.
b. John's claim that S would be true even if John had never made that claim.

Attitudinal objects thus involve a notion of being true "at" a world (which does not require the attitudinal object to exist in that world), rather than "in" a world (which would require the attitudinal object to exist in that world).[12]

Other attitudinal objects may not have truth conditions, but related sorts of conditions. "Bouletic" and "directive" attitudinal objects have conditions of fulfillment:

(27) c. John's desire to become a king was fulfilled.
d. John's request that he be invited was fulfilled.

Similarly, attitudinal objects that are decisions or alike have conditions of implementation or execution:

(27) e. John's decision to postpone the meeting was implemented.
f. John's command that people leave the building was executed.

Even imaginations may have corresponding conditions, let us say conditions of representational correctness. I will call such more general conditions the *satisfaction conditions* of attitudinal objects. The attitudinal or illocutionary force ensures the attitudinal object's aim for truth, fulfillment, implementation, or representational correctness.

Attitudinal objects obviously have truth or satisfaction conditions inherently. They are not externally imposed, as they would be if propositions were identified with sets or abstract formal structures.

[12] See Iacona (2003) for a recent discussion of the notion of truth at a world. Iacona argues that that notion undermines the need for mind-independent and language-independent propositions.

4.1. Characteristic properties of attitudinal objects

4.1.1. Involvement of force Attitudinal objects share truth (or satisfaction) conditions with propositions. However, they differ from propositions in many ways. Attitudinal objects, unlike propositions, are contingent: they exist only if the agent has in fact the relevant attitude or engages in the relevant attitudinal act in relation to the propositional content.

Furthermore, unlike propositions, attitudinal objects depend for their identity on a particular attitudinal or illocutionary force. This is reflected in the fact that identity statements such as the following are generally not judged true:

(28) a. ??? John's thought that it will rain is also his remark that it will rain.
b. ??? John's discovery that it will rain is his hope that it will rain.
c. ??? John's desire to leave is his decision to leave.
d. ??? John's claim that it will rain is his hope that it will rain.

This is in contrast to (28e), which is of course trivially true:

(28) e. John's thought that it will rain is John's thought that it will rain.

Thus, attitudinal objects are identical only if they share both content and force.

4.1.2. Similarity relations Attitudinal objects that are dependent on different acts can enter relations of similarity. Two attitudinal objects that depend on distinct acts, but have the same content and involve at least very similar attitudinal or illocutionary forces, intuitively count as "the same":

(29) a. John's thought is the same as Mary's.
b. John's desire is the same as Mary's.
c. John's claim was the same as Mary's assertion.

As was discussed in Chapter 2, *the same as* in natural language does not express numerical identity, but rather exact or close similarity. By contrast, the *is* of identity *does* express numerical identity and would be inapplicable to distinct attitudinal objects. Thus, the sentence below appears false:[13]

(29) d. ?? John's thought *is* Mary's thought.

4.1.3. Properties of concrete objects Attitudinal objects differ from propositions also in that they may have properties of concrete objects. First, predicates of perception are applicable to suitable attitudinal objects such as remarks or screams, but such predicates are not applicable to propositions:

[13] As was discussed in Chapter 2, the predicate *is identical to* can also express exact similarity:

(i) John's thought is identical to Mary's thought.

(30) a. John heard Mary's remark/scream that she needs help.
b. ??? John heard the proposition that Mary needs help.

Note that (30a) implies both the perception of the speech event and the comprehension of its content.

Attitudinal objects classify as concrete objects moreover in that they may enter causal relations. While it is not uncontroversial whether abstract objects fail to be causally efficacious, certainly causal predicates are problematic with propositions, but not with attitudinal objects, as illustrated by the contrasts below:

(31) a. John's claim that Mary won the race caused astonishment.
b. ?? The proposition that Mary won the race caused astonishment.
(32) a. The thought she might fail frightened Mary.
b. ?? The proposition that she might fail frightened Mary.

(31) and (32) make clear that propositional contents can be causally efficacious only in connection with an attitudinal or illocutionary force and an agent, not as pure propositions.

Attitudinal objects share their ability of entering causal relations with events, and as such, they will involve a particular agent. However, attitudinal objects do not play the very same causal roles as the corresponding events. For their causal role for mental states, not only the eventive aspect of attitudinal objects matters, but also their content:

(33) a. John's speaking delighted Mary.
b. John's speech delighted Mary.

Whereas (33a) can easily describe a case in which it is the manifestation of John's ability to speak that delighted Mary, (33b) strongly suggests that the content of John's speech was also the cause of Mary's delight.[14]

There is another sense in which attitudinal objects are concrete. Like tropes and events, attitudinal objects are generally more specific than the content of their description, that is, a term of the sort *John's belief that* S. In that respect, attitudinal objects differ from abstract objects that are facts or states, entities entirely constituted by the content of their canonical description, as was discussed in Chapter 2. The applicability of comparative predicates to attitudinal objects but not states is illustrated below:

[14] The following sentence sounds all right, even though it seems to state the possible sharing of an attitudinal object by different agents:

(i) John's thought that S might have occurred to Mary.

However, *John's thought that* S may in fact refer to a kind of attitudinal object, "the thought that S," with the specifier *John's* specifying that John "has" the thought that S.

(34) a. John's belief that it will rain is stronger than Mary's belief that it will not.
b. ??? John's believing that it will rain is stronger than Mary's believing that it won't.
c. ??? John's belief state is stronger than Mary's.

"John's belief that S" involves a particular degree of belief, but not so for "the fact that John believes that S" or "the state of John's believing that S," which are entities whose nature is "exhausted" by what is contributed by the content expressed by those terms. "John's belief that S" is concrete, in the sense that it is fully specific and involves a particular manifestation and thus a particular degree of belief.

The attitudinal or illocutionary force involved in attitudinal objects also influences the way evaluative predicates are understood. Evaluative predicates when applied to attitudinal objects are not understood as they would be with propositions; rather they also evaluate the attitudinal or illocutionary mode with which the propositional content is sustained. An illustration is the following contrasts:

(35) a. John's thought that nothing exists is unusual.
b. ?? The proposition that nothing exists is unusual.

(36) a. John's claim that Bill is incompetent is mean.
b. ?? The proposition that Bill is incompetent is mean.

(35a) says that the content of thought entertained by John is unusual, not an abstract semantic object, as in (35b).[15] Similarly, (36a) predicates meanness of a content claimed by John, not of an abstract object as in (36b).

A common view about terms for attitudinal objects is that they are ambiguous: they stand sometimes for propositions, sometimes for mental events or illocutionary acts.[16] However, given the observations presented so far, this view cannot be right. First, terms for attitudinal objects simply do not allow for the readings of predicates that the latter display with explicit proposition-referring terms. Thus, evaluative predicates with the terms in (35a) and (36a) cannot be understood as with explicit proposition-referring terms, and so for identity *is* or *the same as*. Moreover, readings of predicates that are typical with event-denoting terms are not freely available with terms for attitudinal objects, as we will see later. Finally, predicates typical of events and predicates typical of propositions can apply simultaneously to one and the same term:

[15] A simple *that*-clause with *unusual* can refer to neither a proposition nor an attitudinal object. (ia) cannot be understood as (ib) or as (ic), but rather requires a factive reading as in (id):

(i) a. That it is raining is unusual.
b. The proposition that it is raining is unusual.
c. The thought that it is raining is unusual.
d. The fact that it is raining is unusual.

[16] This view can be found, for example, in Pustejovsky (1995).

(37) a. John heard Mary's false remark that S.
b. John's obviously false claim that S caused astonishment.

We should rather conclude that the familiar ontology of propositions and events is simply insufficient to account for the semantic behavior of terms such as *John's thought that* S or *John's claim that* S. Rather these terms stand for objects of another category, namely attitudinal objects.

4.2. Differences between attitudinal objects and mental or illocutionary events

Attitudinal objects share causal properties as well as their dependence on an agent with mental events or states and speech act. However, attitudinal objects are not events, states, or acts.

A first linguistic indication of that is that NPs like *the event of John's thought that* S and *the event of John's claim that* S are in fact unacceptable, as opposed to *the event of John's thinking that* S or *the event of John's claiming that* S.

Events, states, and actions are the more familiar ontological categories in contemporary semantics and philosophy. They typically form referents of gerundive nominalizations such as *John's thinking, John's believing, John's claiming*, or *John's desiring*, but of course, they also fall under the corresponding sortals *event, state*, and *action*.

There are three major ontological differences between attitudinal objects and mental events or illocutionary acts. First, events, states, and actions cannot be true or false or more generally have satisfaction conditions. The lack of truth or satisfaction conditions of events, states, and actions is reflected in the inapplicability of the relevant predicates both to gerundive nominalizations and to event sortals:

(38) a. ??? John's thinking/claiming/believing that S is true.
b. ??? John's desiring/requesting/hoping is fulfilled.
c. ??? John's belief state is true.
d. ??? John's action (of claiming) is true.
e. ??? John's action (of requesting) was fulfilled.
f. ??? John's action of deciding was implemented/executed.

Not mental events or illocutionary acts, but particular mental or psychophysical products are the bearers of truth or satisfaction conditions. Such products have the status of bearers of truth or satisfaction in virtue of the truth-directedness of the corresponding predicational acts. But the fact that with an act an agent aims at truth or satisfaction does not mean that such an act is itself a bearer of truth or satisfaction conditions.

Another important difference between attitudinal objects and events concerns the way the two kinds of entities behave with respect to similarity relations. Attitudinal objects are treated as exactly similar if they share the same content as well as their attitudinal or illocutionary mode. For events involving different agents to be exactly similar, they have to share a lot more than just their content; they need to involve the

very same way of performing the activity. This is illustrated in the contrast between (39a) and (39b):

(39) a. John's speech was the same as Mary's.
b. ?? John's speaking was the same as Mary's.

For (39a) to be true, the content of John's speech needs to be the same as Mary's. However, (39b) would be true only if the way John spoke was the same as the way Mary spoke.

The same conditions are reflected in the difference in the understanding of *similar*:

(40) a. John's thought was similar to that of Mary.
b. John's thinking was similar to that of Mary.

(40a) expresses similarity of thought content, (40b) similarity of thought process.

There is a third major difference between attitudinal objects and events, which concerns their relation to time. It appears that the time of occurrence is accidental to attitudinal objects, but not so for the time of occurrence of mental events. For events in general, their temporal location is essential. Thus, while (41a) is perfectly natural, (41b) does not sound quite right:[17]

(41) a. John's thought might have occurred to him earlier than it did.
b. ?? John's thinking might have occurred earlier than it did.

The distinction between attitudinal objects and mental events or speech acts is in fact a more general one. At the beginning of the twentieth century, the Polish philosopher Twardowski (1912) argued for a fundamental ontological distinction between what he called *actions* and what he called *products*.[18] There are mental actions and products, physical actions and products, as well as psychophysical actions and products. Thinking and desiring are mental actions, thoughts and desires are mental products. Claiming and requesting are psychophysical actions, claims and requests psychophysical products. Thoughts, desires, claims, and requests are non-enduring products that exist only as long as there is the corresponding mental event. The distinction between actions and products also applies in the physical realm: walkings and screamings are physical actions, walks and screams are physical products. While observing that actions and products differ in the kinds of properties they have (including truth or satisfaction conditions), Twardowski characterizes nouns describing products as nouns "that do not bring to force the aspect of action, but bring to force a different aspect, the

[17] The attribution of counterfactual temporal properties appears possible with certain kinds of events. Wars could have taken longer than they did, demonstrations could have taken place at different times than they did, and a death might have occurred earlier than it did. Note, however, that all these cases may involve events as "products," not as "actions." Certainly, *demonstration* and *death* are product nominalizations, contrasting with *demonstrating* and *dying*.

[18] For a presentation of Twardowski's view in its historical context, see Bobryk (2009), Betti (2010), Dubucs and Miskiewicz (2010), and van der Schaar (2006).

'phenomenal' or 'static' aspect" (Twardowski 1912, pp. 104–5). In the particular case of a shout, as opposed to a shouting, he says "in speaking of the shout, we do in fact abstract from the activity of shouting, treating the shout as an acoustic phenomenon" (Twardowski 1912).[19]

In view of Twardowski's general distinction between actions and products, a further property can be added that distinguishes particularly physical actions from physical products. These are "gestalt" properties, or more generally properties that evaluate an entity as a whole. Physical products have gestalt properties but physical actions do not. Gestalt properties form the basis of the application of certain evaluative predicates. Evaluative predicates apply differently to physical actions and products: they can evaluate the former as a whole in the way they could not evaluate the latter. Consider the contrast between (42a) and (42b):

(42) a. Mary's dance was unusual.
b. Mary's dancing was unusual.

The evaluative predicate *unusual* in (42b) evaluates all the various "small" temporal parts of the dancing, but in (42a) it evaluates the dance as a whole and allows Mary's dance to have been unusual just because of the very beginning and the very end, a situation that could not be described by (42b).

An action and its product (as long as it is not a physical product) exist under the very same circumstances: a product exists as long as the corresponding action is taking place, and in any possible world in which there is an action, there will also be the product of the action. Moreover, an action and its product share their spatio-temporal location. Thus, if the distinction is an ontological distinction, this requires recognizing distinct spatio-temporally coinciding entities. That the distinction is an ontological one is plausible in view of the four distinguishing characteristics of actions and products, concerning satisfaction conditions, similarity relations, the relation to time, and gestalt properties.[20] Only an ontological account of the distinction should be able to explain those differences.

Attitudinal objects as the "products" of attitudes obviously are not suited as "objects" of attitudes. Attitudinal objects are entities that involve what the attitude verb would contribute itself: an attitudinal or illocutionary force. The only objects of propositional attitudes there will be are the entities the attitudes are about. The status of attitudinal objects is that of "products of attitudes" rather than "objects of attitudes." This corresponds well to their semantic role as introduced by nominalizing expressions.

[19] The distinction between actions and products that Twardowski draws obviously does not match the distinction that is common in linguistics between event and result nominalizations. Linguists generally take result nominalizations to refer only to the physical products of events.

[20] Note that actions and products are not necessarily spatio-temporally coincident, since the time of occurrence is essential for an action, but not for a product. A product could occur at a different time than it actually did, but not so for an action.

4.3. Kinds of attitudinal objects

Attitudinal objects as mind-dependent propositional objects raise an obvious problem, originally brought up by Frege, namely how it is possible that two agents could share the same propositional content. There are two potential solutions to this problem within the theory of attitudinal objects, and it appears that both solutions are needed for different purposes.

The first one is that when two agents share a propositional content, they are involved in attitudinal objects that are similar or even very similar. This is reflected in the use of *the same* when applied to different attitudinal objects:

(43) a. John's thought was the same as Mary's.
b. John's claim was the same as Mary's.

Attitudinal objects stand in the similarity relation expressed by *the same as* just in case their attitudinal mode and their propositional content (the propositional constituents in the relevant roles) are the same. Recall from Chapter 2 that this is just how *the same as* applies to distinct, though qualitatively identical or very similar, tropes.

However, it is necessary to make sense of the sharing of propositional contents by different agents in yet another way. What is shared may also be a *kind* of attitudinal object, a kind whose instances are particular attitudinal objects. This is the sort of entity that nominalizations of the sort *the thought that* S or *the claim that* S stand for. Such objects obviously can be shared by different agents:

(44) a. John and Mary share the thought that S.
b. The thought that S occurred to both John and Mary.
c. The thought that S was both John's and Mary's.

Kinds of attitudinal objects are the values of definite NPs of the sort *the thought that* S, but the latter show the same "kind term behavior" as bare plurals and mass nouns (Chapter 1):

(45) a. The thought that S is strange.
b. John has never encountered the claim that S.
c. John needs the insight that S.
d. The thought that S has never occurred to anyone.
e. The belief that S is widespread.

(45a) displays a generic reading with an individual–level predicate (an evaluative predicate), (45b) an existential reading with an episodic predicate, (45c) a reading involving quantification over possible instances with intensional predicates, (45d) a reading triggering existential quantification over instances with existential predicates, and finally (45e) involves an instance-distribution predicate.

Kinds of attitudinal objects account not only for the sharing of propositional objects in sentences such as (44a, b, c). They also play a role in a range of sentences with special

quantifiers, as we will see in the next section. The terms for kinds of attitudinal objects are of the form of definite NPs (*the* N' *that* S), but they behave like bare plurals and mass nouns that have the status of terms.

Attitudinal objects that are mere "entertainings" allow for a reconstruction of the notion of a proposition, in one particular semantic role.[21] Propositions obviously do play a limited semantic role, as referents of noun phrases of the sort *the proposition that* S. The semantic value of such terms can now be identified with a kind of attitudinal object, namely the one whose force is that of "entertaining."

5. Attitudinal objects and special quantifiers in sentential position

Special quantifiers when they occur in the place of clausal complements have been one of the motivations for propositions: such quantifiers seem to range over propositions as mind- and language-independent entities that are bearers of truth and falsehood. However, a closer look at the semantic behavior of special quantifiers in sentential position indicates that such quantifiers in fact range over attitudinal objects or kinds of them, rather than propositions.

Let us start with the observation that just like special pro-predicative quantifiers (Chapter 3), special pro-sentential quantifiers cannot be substitutional. Special quantifiers in sentential position can relate, in the very same sentence, to a position that would not allow for *that*-clauses:

(46) a. John said something Mary had never thought about, namely that S.
b. John said something Mary did not like, namely that S.

(47) a. John imagined something I never thought about.
b. John promised everything I ever dreamed of (namely that S, that S', that S", . . .).

In (47a) *something* relates to a sentential position and a referential position that would not allow *that*-clauses (* *Mary never thought about that* S) and similarly for (47b) (* Mary *did not like that* S), (47a) (* *I never thought about that* S), and (47b) (* *I never dreamt of that* S). If what John imagined and what I never thought about is that I would become a dancer, then for (47a) to be true, the truth of the following would be required: *John imagined that I would become a dancer and I never thought about that I would become a dancer.* This sentence, however, is ungrammatical: *about* does not take clausal complements (though it may take as arguments entities like "the possibility that I might become a dancer"). Thus, *something* cannot be substitutional, requiring one and the same expression to fill in the two positions to which *something* relates. Quantifiers like *everything*

[21] The term "entertaining" for an attitudinal object with the most general force was chosen for lack of a better term in English. As a gerund, "entertaining" describes an "action" rather than a "product." In its application to products in the present context, "entertaining" should therefore be understood as a technical term.

and *something* care about objects only and not syntactic categories, and hence they must be objectual in nature.

Similarly, "propositional anaphora" like *that* need not respect the syntactic category of the antecedent. Thus, *that* in (47c) is acceptable even though *about* does not take *that*-clauses as complements:

(47) c. John believes that he might have Swedish ancestors. Mary never thought about *that*.

That is, special pronouns that are anaphoric to a *that*-clause may occur in referential positions. This means that such anaphora do not get their value by being replaced by the antecedent, but rather stand for objects closely related to the semantic value of the antecedent.

As mentioned, special quantifiers are usually considered support for the Relational Analysis. Special quantifiers, given that they are not substitutional, range, it seems, precisely over the potential arguments of attitudinal relations—either propositions or, on the Modified Relational Analysis, a variety of proposition-like objects. However, a number of further linguistic facts about special quantifiers show that what special quantifiers range over are in fact just the kinds of things the corresponding nominalizations stand for, that is, attitudinal objects or kinds of attitudinal objects.

First, special quantifiers allow for restrictions that express perceptual or causal properties:

(48) a. John said something Bill has never heard before.
b. John said something that made Mary very upset.

What Bill never heard before according to (48a) is not a proposition, but rather John's claim that S or better the claim that S (as something that John made). What made Mary upset according to (48b) is not a proposition, an abstract object, but whatever John said, John's claim. What *something* ranges over in (48a, b) thus is not propositions, but the kinds of things nominalizations such as *John's claim* stand for—that is, attitudinal objects, concrete objects that include the attitudinal mode expressed by the verb.

Furthermore, the reading that evaluative predicates display as restrictions of special pro-sentential quantifiers is just the kind of reading we had with attitudinal objects:

(49) a. John said something nice (namely that S).
b. John thought something very daring (namely that S).
c. John imagined something exciting.

An evaluative predicate such as *nice* as a special-quantifier restriction as in (49a) is not understood as a predicate of propositions (or a proposition-like object on the Modified Relational Analysis). Rather it is understood as a predicate of the kind of thing that a nominalization such as *John's claim that S* or *the claim that* S refers to. *Nice* in (49a) says

either that John's claim that S is nice or that *the* claim that S (which is also being made by John) is nice. What *nice* in (49a) does not and cannot mean is that the proposition that S, a semantic object, is nice (the latter could be nice even if what John said is not). Thus, *nice* in (49a) is predicated not just of a content, but a content "sustained" by the particular attitudinal mode (or perhaps some more general attitudinal mode) expressed by the predicate (and possibly a particular agent). Similarly, *daring* in (49b) is not predicated of the proposition that S, but rather either of John's thought that S or *the* thought that S (which is shared also by John). Finally, what is said to be exciting in (49c) is not a proposition, a semantic object, but rather John's imagination or *the* imagination of a content (or a content as imagined by John or "as one can imagine it").

There is a second set of data involving special quantifiers—more surprising, though somewhat less secure—that point in the same direction. These are sentences with a free relative clause expressing the sharing of a propositional content:

(50) John believes what Mary believes, namely that it will rain.

On the Relational Analysis, *what Mary believes* would stand for a proposition which is both an argument of the first and of the second occurrence of *believes*.

There is the following problem for the view that *what Mary believes* stands for is a proposition (or any of the proposition-like objects that a Modified Relational Analysis might postulate). With sufficiently different attitude verbs, speakers generally evaluate the construction in (50) as hardly acceptable or at least as a decidedly funny way of expressing the intended state of affairs. Thus, a number of speakers, at some stage at least, judge the following examples as unacceptable:

(51) a. ?? John remembers what Mary believes, namely that Bill was elected president.
b. ?? John wants what Mary believes, namely that Sue will study harder.
c. ?? John said what Mary believes, namely that it will rain.
d. ?? John believes what Mary imagined, namely that she would be a princess.

On the relevant reading, two independent states of affairs are described by a single sentence, for example in (51a) the state of affairs in which John remembers that Bill was elected president and the state of affairs in which Mary believes that Bill was elected president.

It is important to distinguish this reading from the indirect-question reading. On the latter reading, (51a) would be entirely acceptable, describing the state of affairs in which John remembers that Mary believes that Bill was elected president. It is also important to distinguish the relevant reading from the one available in (52a) on which it is equivalent to (52b):

(52) a. John believes what Mary said.
b. John believes Mary's claim.

In (52a), on the relevant reading, *believe* occurs as a two-place relational predicate, expressing a relation between agents and propositions (*John believes the proposition that* S) or objects like claims, as in (52b).

The data in (51) still fit with the Modified Relational Analysis, since *believe, remember, want, say*, and *imagine* would take different proposition-like objects as arguments. However, consider the predicates in (53a, b):

(53) a. ?? John believes what Bill asserted, namely that S.
b. ?? John remembered what Mary noticed (namely, that Bill had shut the door).

On the Modified Relational Analysis, these predicates would take the same proposition-like arguments (propositions for *believe* and *assert*, and facts for *remember* and *notice*). Yet they are impossible in the construction in question.

The predicates below cannot occur in the relevant construction at all:

(54) a. ??? John saw what Mary knows, namely that it is raining.
b. ?? John saw what Mary heard, namely that someone opened the door.

The attitude verbs in (54a, b) are epistemic in nature. Yet they cannot share a propositional content. They resist (on the relevant reading) full NP complements of the sort *the proposition that* S, *the fact that* S, or *the possibility that* S entirely, and thus the Modified Relational Analysis could not apply to them.

What is interesting about the data in (51) and (53) is that it is perfectly clear what the sentences would mean if they were acceptable (which might be one of the reasons why some speakers—especially those with standard philosophical training—tend to judge them acceptable).

Under what conditions is the construction in (50) possible? Strict identity of the attitude verbs is not required. At the same time, it is not sufficient that the verbs express relations of the same type, for example, epistemic relations, illocutionary relations, or doxastic relations. They also have to share their perceptual, epistemic, or communicative "mode." Attitude verbs that describe propositional attitudes of the same type with the same "mode," though with different "strengths," are in fact possible in the construction in question:

(55) a. John has often suggested what Mary now claims, namely that Bill is a spy.
b. John sometimes tended to believe what Mary is now convinced of, namely that Bill is a spy.
c. John demanded what Mary was going to request, that the door be opened.

Thus, the data require a much finer distinction among different attitudinal objects than is captured by the distinction among propositions, facts, and possibilities. The entities that relative clauses, such as *what John thought* or *what John claimed*, stand for, are in fact attitudinal objects or rather kinds of attitudinal objects, entities of the sort "the thought that S" or "the claim that S."

Sharing of attitudinal objects can be expressed not just with relative clauses. Other constructions with special quantifiers or pronouns also serve that purpose and impose the same constraint:

(56) a. ??? John wants something that Mary believes, namely that Sue will study harder.
b. ??? John saw something that Mary knows, namely that it is raining.
c. ??? John saw something that Bill just learned, namely that it is raining.

(57) a. ?? There is something John believes and Mary remembers, namely that it will rain.
b. ??? There is something that John saw and Mary knows, namely that it is raining.

The expression of shared attitudinal objects thus provides further evidence for the Nominalization Theory of special quantifiers, the theory that special quantifiers and pronouns do not range over entities as potential arguments of the predicate, but rather introduce a new domain of quantification, consisting of just the kinds of things a corresponding nominalization would refer to.

Special pro-sentential quantifiers allow for a greater flexibility concerning the objects they introduce than special pro-predicative quantifiers. In particular, special pro-sentential quantifiers may introduce attitudinal objects that are more abstract or more general than the content of the attitude verb in question. In the extreme case, these attitudinal objects may be constituted just by the most general attitude, that of mere "entertaining." This is what, on the present view, underlies the peculiar status of the generalizations about the sharing of attitudinal objects. It was mentioned already that not all speakers accept the judgments given in (51), (53), and (54). Some speakers seem to accept all and some accept many of the examples after some exposure or against particular circumstances. The relevant readings become available in particular with the addition of adverbial modifiers and focusing:

(58) a. John finally said what Mary has always believed.
b. John said what Mary doubts (namely that the meeting would be fruitful).

This variation is not a problem for the Nominalization Theory of special quantifiers as such. Rather the variation among available readings for different speakers can be traced to a general possibility for entities like attitudinal objects to vary as to how much of the contribution of the verb they will incorporate. Let me call this the *variability of attitudinal objects*.

Why are the examples in (58) acceptable? Here focus on the modifier or the predicate goes along with a more abstract attitudinal object being the topic of the sentence. That is, in (58a, b), the attitudinal objects that the special quantifier ranges over are more general than the attitudinal objects characterized by the verb. In (58a), the attitudinal object is one common to an act of saying and an act of believing.

What the nominalization function extracts in (58a) and (58b) is thus such a shared attitudinal object of entertaining. As a matter of fact, what is shared according to (58a, b) is a *kind* of attitudinal object. It is not John's entertaining that S or Mary's entertaining

that S, but the entertaining that S, that is, a "proposition" in the reconstructed sense of a proposition discussed in the preceding chapter.

The availability of a more general shared attitudinal object depends on various and variable factors, such as the information structure of the sentence (focus, presence of modifiers) as well particularities of individual speakers (such as perhaps their philosophical training). I will later propose that it formally corresponds to the availability of a semantic decomposition of an attitude verb into a more general attitudinal relation and a modifier of such a relation. The availability of a more general attitudinal object then depends on whether a speaker or the formal context allows for such a semantic reanalysis of the attitude verb or not. I will turn to the formal semantics of special quantifiers, and in particular the construction in (50), after developing the semantics of attitude reports with *that*-clauses in the next section.

To summarize, we have seen that special quantifiers do not provide evidence for proposition-like objects acting as arguments of attitude verbs. Rather they act as nominalizing expressions, inducing reference to attitudinal objects obtained from both the content of the attitude verb (or part of it), that is, an intentional predication relation, and a sentential content.

6. A neo-Russellian analysis of attitude reports

6.1. Intentional predication and the Russellian Multiple Relations Analysis

A central problem with propositions was how propositions if they are structured can as such be true or false and, given their structure and components, have the particular truth conditions they have. The source of the problem is that formal objects such as sequences of properties and objects simply cannot be truth-directed without intentionality, without an agent aiming at truth.[22]

The problem of the truth-directedness of propositions and the problem of the unity of structured propositions have a single solution and that is to view predication itself as an intentional relation, a relation relating an agent to a property and its arguments. That is, an agent predicating a property of objects is what makes up the "glue" among the propositional constituents and the aim for truth (or satisfaction) of the proposition itself. An agent is successful in predicating an n-place property of n objects just in case the property holds of the objects.[23]

Going along with the range of propositional attitudes, there will not be a single intentional predication relation, but a range of them. Propositional attitudes, on

[22] This also conforms with Dummett's (1973) view according to which truth values are not considered objects assigned to propositions, but rather the outcome of successful intentional acts or states such as successful assertions or beliefs. On Dummett's view, conditions on truth should go along with conditions on assertion, namely verification conditions.

[23] Recently, this approach to the problem of truth-directedness and the unity of propositions was pursued independently by a number of philosophers of language such as Jubien (2001), Hanks (2007a), and Soames (2010). See also Moltmann (2003a).

this view, will fundamentally be ways of predicating a property of its arguments. Only derivatively may propositional attitudes also be relations toward attitudinal objects or kinds of them.

Propositional attitudes as intentional predication relations may be composed of simpler intentional predication relations. In fact, following the traditional view about propositional attitudes in general, all intentional predication relations will be based on the most general relation of "entertaining." With "entertaining," an agent does not aim at truth, but simply considers the property holding of the objects in question. Again, following the traditional view, the relation of judgment is the most general relation aiming at truth; it consists in entertaining while approving of the property holding of the objects. The relation of belief, on that view, involves further conditions (such as perhaps that of maintaining a disposition to judge).

Formally, the view that propositional attitudes themselves are fundamentally intentional predication relations matches well Russell's (1912, 1913, 1918) Multiple Relations Analysis of attitude reports (Jubien 2001, Moltmann 2003b, Soames 2010). Russell (1912, 1913, 1918) argued that propositional attitudes are not binary relations between agents and propositions, but rather "multiple relations," relating an agent to the constituents of a propositional content. In the case of atomic sentences, the propositional constituents are properties and their arguments. Thus, in *John believes that Mary is happy*, a three-place belief relation is said to obtain among John, the property of being happy, and Mary. In the case of *John believes that Mary likes Bill*, the belief relation is a four-place relation, said to obtain among John, the loving relation, Bill, and Mary, as below:

(59) a. John thinks that Mary likes Bill.
b. think(John, LIKE, Mary, Bill)

Thus, there is no single belief relation, but several, depending on the form of the propositional content involved.

Russell's motivations for the Multiple Relations Analysis were very different from the present ones, and an intentionalist notion of content was certainly not one of them. Russell in fact did not take his analysis to provide a solution to the problem of the unity of propositions.[24] Russell, moreover, did not have particular linguistic data in mind to motivate his account. His motivations rather were of a metaphysical and epistemological nature. Russell had general reservations about representations as the intermediaries between an agent and the world, be they concepts, Meinongian objects, or propositions. The relation between an agent and the world, on Russell's view, is

[24] To the contrary, Wittgenstein convinced Russell that his analysis was in serious difficulty precisely because it appeared to face that problem. Wittgenstein's objection was the following. If attitude verbs can take any number of objects all of which have equal status, how is this to rule out propositional contents consisting just of individuals, and how does this ensure that in *John thinks that Mary likes Bill* the liking relation is understood so as to be predicated of Bill and Mary in a certain order? Russell later proposed a more complex solution to the problem.

direct, not mediated, and propositional attitudes ultimately relate an agent to objects he is acquainted with (particulars or universals).[25] For Russell, instead of propositions there were only three sorts of proposition-like objects: sentences (what Russell also sometimes called "propositions"), which are "incomplete symbols" (requiring an attitude verb for their completion), intentional acts or states (that is, multiple attitudinal relations relating a particular agent to propositional elements), and contents abstracted from intentional states (that is, those sequences consisting of a relation and its arguments for which there is an attitudinal relation relating them to an agent) (cf. Russell 1913, pp. 116 ff.).[26]

Russell's account of attitude reports has been subject to criticism and generally been discarded (see Sainsbury 1979). In particular, the account has been dismissed as being linguistically implausible, because attitude reports appear relational in nature, with the *that*-clause denoting a proposition as an argument of the relation expressed by the attitude verb. However, it appears that Russell's analysis has in fact significant linguistic plausibility once it is worked out in a certain way, relying on somewhat more sophisticated formal semantic means. In this book, I do not aim at a fully developed theory of sentence meaning within a neo-Russellian approach. Rather I have to restrict myself to indicating how such an account can be developed, so that it will not obviously run into the problems that arose for Russell's original account.

First, rather than taking attitude verbs to specify different attitudinal relations in contexts of different *that*-clauses, as Russell did, attitude verbs can be regarded as multigrade predicates (Oliver and Smiley 2006).[27,28] But the agent and the propos-

[25] In Russell's ontology, then, there was space only for facts, individuals, and properties, but not false propositions, which, unlike true propositions, could not be identified with facts and are not needed in a full description of the world. See Sainsbury (1979) and Griffin (1985) for a discussion of Russell's Multiple Relations Theory.

[26] Russell sometimes also appealed to mere intuition to motivate his account of attitude reports: "His [Meinong's] view is that there is an entity, namely the 'proposition' . . . , to which we may have the dual relation of assumption or the dual relation of belief. Such a view is not, I think, strictly refutable, and until I had discovered the theory of incomplete symbols, I was myself willing to accept it, since it seemed unavoidable. Now, however, it appears to me to result from a certain logical naïvité, which compels us, from poverty of available hypotheses, to do violence to instincts which deserve respect" (Russell 1913, Part II, Chapter I, p. 108). And "To me . . . it seems obvious, as a matter of inspection, that belief is a multiple relation, not a dual relation, so that belief does not involve a single object called a 'proposition'" (Russell 1913, Part I, Chapter V, p. 153).

[27] There are two problems for the view that attitude verbs denote different fixed relations in different syntactic contexts. First, since sentences may be of indefinitely many different logical forms, infinitely many belief predicates would have to be distinguished, which is at best implausible (cf. Sainsbury 1979). Moreover, the view is untenable in the face of cases like (ia) and (ib):

(i) a. John knows what Mary believes.
b. John believes everything Mary believes.

Since a speaker can utter (ia) without knowing what Mary believes (and thus without knowing the logical form of her belief content), he would not know which verb *believe* to use. In (ib), Mary may believe various things differing in the number of propositional elements that make them up. In this case, there is not any one verb *believe* that could have been used.

[28] Making use of multigrade predicates was not an option available to Russell; see Griffin (1985).

itional constituents will not play the same semantic role with respect to the attitude verb. Multigrade attitudinal predicates require a distinction between *places* and *positions*.[29] The relation expressed by *think*, for example, will be a relation that has two places, and it is multigrade in its second place. This means that *think* has an unlimited number of positions in its second place. On the neo-Russellian analysis, (60a) has the logical form in (60b), which minimally differs from (59b):

(60) a. John thinks that Mary likes Bill.
b. THINK(John; LIKE, Mary, Bill)

The distinction between places and positions reflects the fact that the subject argument plays quite a different role regarding the attitude verb than the propositional constituents given by the embedded sentence.[30] The constituents of the embedded sentence violate standard linguistic constraints of argumenthood with respect to the embedding attitude verb. For example, Chomsky (1981) imposes rather restrictive conditions on the relation between a predicate and the constituents providing arguments for it (what Chomsky calls "theta-role assignment"), amounting to the constituents being sister constituents of the predicate. It is clear that such constraints do not hold for the constituents of a *that*-clause that are supposed to provide arguments for the embedding verb.

Within the multigrade argument place of an attitude verb, there will be different positions for different roles: one distinguished argument position for a property, meant to be predicated of the other arguments, as well as further argument positions matching the argument positions of the property. Formally, the multigrade position of an attitude verb will have the very same argument structure as the instantiation relation, which takes a universal as well as a suitable number of objects relating at their places to the relevant argument positions of the universal. The agent standing in the attitudinal relation has as his aim the property in the distinguished position holding of the arguments in the other positions.

A given place in the multigrade position of an attitude verb may itself be multigrade, containing a distinguished place for a function, for example, and others for the arguments of the function—in case of functional terms. Multiple nestings of multigrade argument positions are not a problem formally, and can be accounted for by using multiple indexing (Taylor and Hazen 1992): each index corresponds to the position within a multigrade place, for subsequently deeper nested places (or "positions"). Thus, the argument positions of *think* that are used in (60a) are <1> (for John), <2, 1> (for the liking relation), <2, 2> (for Mary), and <2, 3> (for Bill).[31]

[29] For the distinction between places and positions of multigrade predicates see Oliver and Smiley (2004).

[30] Russell in (Russell 1918) criticized his (Russell 1912) view according to which *think* in (60a) would take *likes* as a complement in the same way as *likes* takes *Bill* as a complement. Russell in (1913, 1918) left it open in what way exactly *believe* involves the propositional constituents.

[31] The ordering among argument positions and places that such indexing establishes is not part of the nature of the multigrade relation itself, which, like relations in general, is a neutral relation in the sense of Fine (2000).

Obviously, the structure of the multigrade position matches a structured proposition, on a standard conception. However, a structured proposition rather than being considered a single object should in the present context be viewed as an ordered plurality of propositional constituents, in the sense of a plurality as "many," not as "one." More correctly, it should be considered a hierarchically ordered plurality, a "configuration" of elements as "many" in order to reflect the compositional semantic structure of more complex sentences. In order to simplify things, though, I will just talk about ordered pluralities for the rest of this chapter. An ordered plurality can itself be represented as a sequence using multiple indexing (Taylor and Hazen 1992). Thus (60a) may be represented by the sequence $\text{THINK}_{<1>}$, $\text{John}_{<2,\ 1>}$, $\text{LIKE}_{<3,\ 2,\ 1>}$, $\text{Mary}_{<4,\ 2,\ 2>}$, $\text{Bill}_{<5,\ 2,\ 3>}$, keeping track of the order of arguments as well as the depth of nesting.

Attitudinal relations do not have just an argument position that is multigrade; rather each place within that position may itself be multigrade. The reason is the possibility of multiply embedded attitude reports such as *John believes that Sue thinks that Mary likes Bill*. Here *believe* in its multigrade position takes the multigrade think-relation, Sue, and in a single position that is multigrade itself the liking-relation, Mary, and Bill. Again, formally, such complex argument structures can be represented by using in principle unlimited indexing of arguments (Taylor and Hazen 1992).

It is sharing of ordered pluralities of this sort in virtue of which attitudinal objects with different forces share the same content. Ordered pluralities of propositional constituents will also be involved in quantification with special quantifiers and in the specification of truth conditions for sentences. They can in fact be identified with the meanings of sentences, but as pluralities, not single propositions.[32]

The neo-Russellian Multiple Relations Analysis obviously accounts for the substitution problem for propositions since on that analysis, *that*-clauses do not stand for single objects, but for ordered pluralities of propositional constituents.

The neo-Russellian analysis provides a straightforward answer to the question of what it means for a *that*-clause to specify the mere content of an attitude rather than an object the attitude is about or directed toward. Specifying the mere content means that the target of the attitude is not an object, but rather the connection among propositional constituents, in particular the relation between a property and its arguments. Let us look at the examples below:

(61) a. John expects that Mary will win.
John expects the proposition that Mary will win.
b. John imagined that Mary was alive.
John imagined the proposition that Mary was alive.

[32] This would of course hold only for sentences taken apart from any "illocutionary force indicator." Together with a specific illocutionary force indicator, independent sentences can be taken to express properties of agents that represent illocutionary act types (see Section 6.2).

c. John remembers that Mary won.
John remembers the proposition that Mary won.

In (61a, b, c), the propositional attitudes described by premise and conclusion are the same; but their target is different. Intuitively, the difference between premise and conclusion in (61a) is that the expectation is fulfilled, according to the conclusion, by the presence of an object (a proposition), but according to the premise, by the holding of a property (the property of winning) of an object (Mary). In the conclusion of (61b), John's imagination consists in a mental representation of an object (a proposition), but in the premise of (61b) in the attribution of a property (being alive) to an object (Mary). According to the conclusion of (61c), what is reactivated in John's mind is the representation of an object (a proposition), but according to the premise it is the holding of a property (the property of winning) of an object (Mary).

Propositional attitudes expressed by verbs that display the Objectivization Effect target the relation between predicate and argument on the content-related reading in just the way they target an object (or perhaps the presence of an object) on the object-related reading. That is, the target of such a propositional attitude in the clausal construction is the relation between the embedded predicate and its arguments. By contrast, in the nominal construction, the target of the attitude is the object that the nominal complement refers to.

Since it appears that the primary way of describing a propositional attitude in terms of its content is the sentential construction, the Objectivization Effect reveals something about the nature of propositional attitudes themselves—not just the way we happen to describe them. The Objectivization Effect supports the view that propositional attitudes are, at least primarily, not relations to propositions, but ways of combining propositional constituents—more precisely, ways of predicating properties of objects.

A final question to ask is, how should the neo-Russellian analysis account for the observation that with some verbs a clausal complement *that* S can be replaced by *the proposition that* S, with others by *the fact that* S, and yet with others by *the possibility that* S? Such inferences will be a matter of the particular nature of the multigrade relation in question as well as the existence of a corresponding two-place predicate. On the neo-Russellian analysis, the *that*-clause complement always provides multiple arguments, not a single argument for the (multigrade) relation expressed by the verb. However, attitude verbs may have a relational variant, taking propositions, facts, or possibilities as arguments. *John notices that* S implies *John noticed the fact that* S simply because the truth of the former presupposes the existence of "the fact that S" and the multigrade predicate *notice* has a two-place variant, which denotes a relation between agents and facts.

6.2. Complex sentences

The Multiple Relations Analysis faces particular challenges when it comes to more complex sentences. The main problem is how to avoid that an embedded disjunction such as (62a) or an embedded conditional such as (62b) implies that John believes that S:

(62) a. John believes that S or S'.
b. John believes that if S, then S'.

In (62a, b) predication in the belief-way can target only the highest connectives, *or* or *if-then*, not the predicate of the embedded sentences S or S'. The predicates of the embedded sentences could be the target only of the most general intentional predication of entertaining. This problem, known in the philosophical literature as the Frege-Geach problem, is a well-known problem for expressivism. I will not discuss the problem in detail, but mention only two options that present themselves within the present neo-Russellian analysis.[33] First, one might consider connectives such as *or* and *if-then* multigrade predicates taking attitudinal objects of entertaining as arguments in any of their places. Alternatively, one might take connectives to be multigrade also with respect to each of their argument places, so that the propositional constituents given by the embedded sentences will fill in the various positions within any of those argument places. This requires imposing conditions to the effect that only the highest predicate or connective will involve the specific predication relation expressed by the verb, whereas the lowest predicates or connectives will be involved only in the most general predication relation of entertaining. On the first view, *John believes that Mary wins or Bill wins* will have the analysis in (63a); on the second view, its analysis will look as in (63b):

(63) a. believe(John; OR, f[WIN, Mary], f[WIN, Bill])
b. believe(John; OR, WIN, Mary; WIN, Bill)

The same two options carry over to expressions that may be considered sentential operators, such as modal and temporal operators. The general condition is that a particular propositional attitude expressed by an attitude verb will target only the highest predicate, operator, or connective in the sentences, specifying the mode in which it is to be predicated of its arguments. Operators and connectives themselves will provide the connection among lower-level propositional constituents.

The neo-Russellian approach shares a number of issues concerning complex sentences with structured propositions approaches. This means that whatever one's preferred version of the theory of structured propositions, it will be applicable to the neo-Russellian approach as well. This includes the treatment of quantifiers, variables, and complex predicates.[34]

[33] In his written work, Russell himself did not say much about how sentences other than atomic ones are to be accounted for.

[34] For example, quantifiers on either approach may be taken to express higher-order functions, functions mapping a property to a truth value. In the case of *John thinks that everyone is happy*, the *that*-clause provides the sequence of a quantifier and a property. It is straightforward to extend this account to sentences with more than one quantificational argument with particular scopal relations, by using generalized quantifier theory, where different generalized quantifiers are assigned to subject and object NPs with a particular scope-order (Keenan and Faltz 1985).

The semantics of independent sentences will be similar to that of embedded ones. Independent sentences as such specify a sequence of propositional constituents; but together with, let's say, the declarative mode, they specify a property of agents as in (64), for a content $<C_1, \ldots, C_n>$ and the multigrade assertion relation ASSERT:

(64) $\lambda x[\text{ASSERT}(x, C_1, \ldots, C_n)]$

That is, by asserting *Mary is happy*, an agent will predicate of Mary, in the assertive mode, the property of being happy.

I have taken the meanings of sentences, in simple cases, to consist in sequences (ordered pluralities) of properties or relations and their arguments. This is in what the present neo-Russellian account shares with a common version of the structured propositions account. However, in the present case, the fact that the constituents are arguments of a multigrade attitudinal relation will ensure that the sequence forms the content of an attitudinal object that is truth- or satisfaction-directed and has the right truth conditions. This is what the multigrade attitudinal relation guarantees, but what would have to be imposed on a structured proposition from the outside. Based on the truth conditions of attitudinal objects, truth conditions can be assigned indirectly to the sequence denoted by a sentence and in fact to the sentence itself:

(65) A sentence *S* expressing the sequence $<C_1, \ldots, C_n>$ is true in a circumstance *c* iff for any kind of attitudinal object *t* with $C_1, \ldots, C_n$ as propositional constituents, *t* is true (satisfied) in *c*.

Note that by making use of kinds of attitudinal objects, a sentence has truth conditions even if the structured proposition expressed by it has never been the content of a particular attitudinal object.

6.3. Other sentence-embedding predicates

The neo-Russellian analysis does not necessarily apply to all attitude verbs, that is, some attitude verbs may not express multigrade predication relations. An example is emotive factives such as *be glad, be angry*, and *is surprising*. Emotive factives generally allow for a replacement of *that* S by *(about) the fact that* S:

(66) a. Mary is glad that S.
b. Mary is glad about the fact that S.

(67) a. That S is surprising.
b. The fact that S is surprising.

This makes a quasi-relational analysis plausible according to which the *that*-clause in the context of the complement or subject position of an emotive factive verb serves to describe a fact that will then act as an argument of the predicate. Epistemic factives like *know, realize*, and *see*, by contrast, do exhibit the Objectivization Effect and thus are not

up for a quasi-relational analysis.[35] With those verbs, the predication relation that is expressed would be subject to the general factive condition that the predicate actually holds of the arguments. Other attitude verbs such as *agree, convince*, and *deny* may involve more than one act of predication.

The neo-Russellian analysis of attitude reports raises the question how sentences should be analyzed that are embedded under predicates that are generally not considered predicates expressing intentional predication relation, for example *is true, imply*, or *contradict*. I will restrict myself to only a few remarks on the issue. In some cases, embedded clauses do not actually display the Substitution Problem and the Objectivization Effect. Again, the behavior of *that*-clauses with respect to substitution should be taken into account. *Is true* does allow substitution of a subject clause by *the proposition that* S, which again is suggestive of a quasi-relational analysis according to which the *that*-clause in that particular context serves to describe a proposition to which the truth predicate then applies (in, of course, the sense of "proposition" as the most general kind of attitudinal object). This also holds for *that*-clauses in the subject or complement position of *imply* or *contradict*. However, the same does not hold for the predicate *is possible*, which does not allow substitution of the *that*-clause by *the proposition that* S, but only by a special quantifier:

(68) a. That S is possible.
b. The proposition that S is possible.
c. Something is possible.

(68a) and (68b) are not equivalent: *is possible* with a *that*-clause means "is possibly true," and with a referential term "possibly exists." A deflationary account of truth would obviously avoid positing propositions as referents of *that*-clauses and as arguments of truth-related predicates. Then the question is what to do about special quantifiers and pronouns in place of *that*-clauses. Here the Nominalization Theory is not of much help: there is no attitude involved in the sentence on the basis of which an attitudinal object could be introduced—though, of course, special quantifiers in such contexts may range over "propositions" in the sense of the most general kinds of attitudinal objects.[36]

6.4. Empirical evidence for the neo-Russellian view: plural terms for propositional contents

On the neo-Russellian account, attitude verbs are multigrade predicates (with respect to their object argument position). Multigrade predicates, like plural predicates, take pluralities as arguments, though these will be ordered pluralities. Ordered pluralities, I have argued, form the denotations of *that*-clauses. The purpose of this section is first to

[35] Russell (1913), though, took epistemic verbs of perception to express relations taking facts as arguments—as did Vendler (1972).

[36] Recall that such kinds exist even if no one has entertained the propositional content in question.

show that ordered pluralities may form the arguments of predicates in natural language in general. Furthermore, it will present particular linguistic evidence for the status of the object argument of attitude verbs as a plurality.

Besides attitude verbs, there are other kinds of multigrade predicates in natural language, and they in general allow for both lists (which denote ordered pluralities) and plurals. The predicate *add* is one such predicate. It takes a list as a complement in (69a) and a plural NP in (69b):

(69) a. John added two and two and three.
b. John added these numbers.

Add in (69a) is a multigrade predicate rather than a plural predicate because in its second, multigrade place, the same entity may occur as an argument twice.

The view that clausal complements have the status of plural arguments is quite a non-standard view; but there is some linguistic evidence for it, namely the ability of certain *that*-clause-taking verbs to accept plural NPs as complements instead of a *that*-clause. For example, *say* in English allows for the plural *those words* as complement, instead of a *that*-clause.

(70) John said those words.

In (70), *those words* stands for a plurality of words in a certain order, not an unordered plurality. (In fact, it is likely to stand for words in the particular structural configuration of a sentence.)

Natural languages sometimes distinguish different plural forms for ordered and unordered pluralities. For example, in German, *Wort* "word" has two plural forms: *Wörter* for the unordered plurality and *Worte* for the ordered plurality. The plural *Worte* means as much as "sentence or sentences," that is, "words in a particular order with a particular sentential structure and meaning." Thus, the order of the words matters in (71a), but not in (71b):

(71) a. Hans hat diese Worte verwendet. Maria hat sie auch verwendet.
"John has used those words. Mary has used them too."
b. Hans hat diese Wörter verwendet. Maria hat sie auch verwendet.
"John has used these words. Mary has used them too."

An important observation is that unlike *Wörter*, *Worte* can be the complement of verbs that otherwise only accept *that*-clauses and special NPs, such as *sagen* "say":

(72) a. Hans sagte diese Worte.
"John said those words."
b. ??? Hans sagte diese Wörter.
"John said those words."
c. Hans sagte, dass es regnet.
"John said that it is raining."

d. ??? Hans sagte diesen Text.
"John said that text."
e. Hans sagte etwas.
"John said something."

Moreover, *Worte* and *that*-clauses can flank a predicate of identity, which is not possible with *Wörter* and a *that*-clause:

(73) a. Seine letzten Worte waren, dass alles vergeben ist.
"His last words were that everything was forgiven."
b. ??? Seine letzten *Wörter* waren, dass alles vergeben ist.
"His last words were that everything was forgiven."

Worte is a plural NP both syntactically and semantically (and not, let us say, an NP of the same semantic status as a singular collective NP). Thus, *Worte* allows for predicates that take only plural complements, such as *voneinander unterscheiden* 'distinguish from each other' (Chapter 1, Section 6):

(74) Maria konnte seine Worte nicht voneinander unterscheiden.
"Mary could not distinguish his words from each other."

Thus, there are at least some plural expressions in some languages that can play exactly the semantic role of *that*-clauses.[37]

There is further evidence for the plural status of clausal complements. It comes from semantic selectional requirements, more precisely the Accessibility Requirement, as discussed in Chapter 1. Recall that the Accessibility Requirement says that predicates making reference to the parts of an argument (but not the whole) require pluralities as arguments and cannot take single objects. The Accessibility Requirement manifests itself with clausal complements as follows. Predicates that care about the internal structure of a propositional content or the manner of its presentation and not just its truth conditions in general allow only for *that*-clauses as arguments and not for proposition-referring NPs. These are predicates like *think* (expressing occurrent thought), *write, shout*, and *whisper*:

(75) a. John thought/wrote/shouted/whispered that S.
b. ??? John thought/wrote/shouted/whispered the proposition that S.

By contrast, predicates like *believe* and *assert*, which focus on the content only, allow for both *that* S and *the proposition that* S.

We can thus conclude that there is significant linguistic evidence for *that*-clauses having the status of plural arguments and attitude verbs being multigrade predicates.

[37] Of course, it remains to be explained why not all attitude verbs allow for a plural NP representing propositional constituents. In fact most attitude verbs don't:

(i) ??? John thought/believed/suspected/hoped/feared those propositional constituents/those concepts.

7. The ontology of attitudinal objects

Let us now turn to the ontology of attitudinal objects. Coming from a proposition-based approach, one might conceive of "John's belief that S" as a qua object in the sense of Fine (1982), namely as the proposition that S qua being believed by John. Such a qua proposition would inherit certain properties from the base proposition ("the proposition that S"), in particular its truth conditions, though the attitudinal component (the property of being believed by John) will also be an essential feature. However, attitudinal objects have the advantage of allowing to dispense with the notion of a proposition together with the various problems that go along with it. I will propose an account of attitudinal objects not making use of propositions. On that account, attitudinal objects are tropes involving the notion of intentional predication introduced in the last section. This account will do justice to the concreteness of attitudinal objects as well as the ways in which attitudinal objects differ from events. Both events and attitudinal objects will be conceived in terms of tropes: they will both be complex tropes, but of very different kinds.

Generally, tropes are referents of de-adjectival nominalizations. Therefore, it may not initially be plausible that attitudinal objects, which are referents of deverbal nominalizations, are tropes. However, there are deverbal nominalizations that do describe tropes, for example *weight* and *smile*. *Weight* and *smile* clearly are predicates of tropes, not events. Thus, the view that attitudinal objects as referents of deverbal nominalizations are tropes is not entirely unmotivated.

In Chapter 2, I had argued that events are best conceived as second-level relational tropes, namely as instances of temporal transition relations involving first-level tropes in times. Given this account of events, it is clear why events cannot have truth conditions. Temporal transitions are just not true or false. There is nothing truth-directed about temporal transitions. It can also be explained why events on this conception do not enter relations of close similarity when they have the same content and are of the same type. Different events with different agents will certainly involve transitions among many qualitatively different tropes, and those first-level tropes will ensure distinctness. Finally, the present account explains why the time during which an event takes place is constitutive of the event. If relations of temporal transition make up an event, this implies that the relevant periods are also constitutive of the event.

On the present view, both attitudinal objects such as "John's thought that S" and events such as "John's thinking that S" are tropes, but complex tropes of quite different sorts.[38]

The idea is that what distinguishes attitudinal objects from events is that they are instantiations of a multigrade attitudinal or illocutionary relation. This explains the way

[38] I will leave out the category of states, such as "John's believing that S." States, as we have seen in Chapter 2, are on a par with facts rather than with tropes and events. Consequently, they require a very different ontological account, one that assimilates them to facts. See Chapter 2, Section 8. See also Moltmann (forthcoming (a)).

evaluative predicates are understood: evaluative predicates when applied to attitudinal objects care also about the attitudinal or illocutionary force and not just the propositional constituents.

One might then take attitudinal objects to be relational tropes instantiating a multigrade attitudinal or illocutionary relation. That is, "John's belief that Mary likes Bill" would be the instantiation of the multigrade belief relation in John, the liking relation, Mary, and Bill. However, this view faces several problems. First, it makes the wrong predictions about perceptual properties: perceptual properties predicated of an attitudinal object can target only the agent, never a propositional constituent. Thus, the agent and the propositional constituents cannot be on a par, both being bearers of the trope that is an attitudinal object. For example, if Joe heard John's remark that Mary hit Bill, this can never mean that Joe heard Mary hit Bill. An even more serious problem for the view is that it gets the similarity relations wrong that attitudinal objects display. If "John's belief that Mary likes Bill" is the instantiation of the belief relation in four entities (John, the liking relation, Mary, and Bill), then such a relational trope should be exactly similar to "Mary's belief that Joe kissed Sue," which is an instance of the same multigrade belief relation. However, this is clearly wrong. "John's belief that Mary likes Bill" can bear exact similarity only to a belief with the same content (though possibly a different agent), such as "Joe's belief that Mary likes Bill."[39]

A better way of conceiving of attitudinal objects as instances of attitudinal or illocutionary multigrade relations is as what I will call *quasi-relational tropes*. Quasi-relational tropes are monadic tropes instantiating object-dependent properties based on relations. The examples below illustrate the difference between relational and quasi-relational tropes:

(76) a. the relation between John and Bill
b. John's relatedness to Bill
c. Bill's relatedness to John

Whereas (76a) stands for a relational trope, (76b) and (76c) stand for quasi-relational tropes. There are also more specific terms that stand for quasi-relational tropes, for example *John's fatherhood*. Relations in general give rise to both relational tropes and (possibly various types of) quasi-relational tropes (and of course with three or more place-relations, a mixture of both).

Attitudinal objects, I propose, are quasi-relational tropes that are instantiations in an agent of complex properties of the sort λx[believe(x; LIKE, Mary, Bill)]. This explains straightforwardly the sorts of properties attitudinal objects may have. As quasi-relational tropes, two attitudinal objects are "the same" just in case they involve the same attitudinal mode and the same propositional constituents. Perceptual properties will

[39] A further problem for the view is that it treats all propositional constituents as bearers of a relational trope ontologically on a par, as objects in the world. However, some propositional constituents may be considered concepts, which means, entities one might not want to assign the status of actual objects.

target only the one bearer of the trope, the agent. As instances of intentional predication relations, attitudinal objects will obviously be truth-directed (or satisfaction-directed). Furthermore, propositional constituents will not necessarily obtain the status of objects: propositional constituents may be concepts, occupying a position in the multigrade place of the attitude verb specifically marked for such concepts. Finally, it is explained why the time of occurrence is only accidental to an attitudinal object. An attitudinal object as the instantiation of an attitudinal property of an agent need not involve the time of that instantiation as an essential component. In the case of events, by contrast, times were the bearers of the relational trope itself and thus essential components.

This account of attitudinal objects can be extended to physical products. A walk or a scream would be the instantiation in an agent of the property (of an agent) to have particular physical properties at subsequent times. In a very simple case, such a property may be of the form $\lambda x[\exists t\ \exists t'(P^t(x)\ \&\ Q^{t'}(x)\ \&\ t < t')]$, for contrary properties *P* and *Q* and "$t < t'$" meaning "*t* immediately precedes *t'*."

The account also explains why gestalt properties are unproblematic with products, but problematic with actions. There is no problem for an agent (of a product) to instantiate a time-related property involving an interval as a whole. However, gestalt properties involving the interval as a whole can hardly play a role in actions as instances of temporal transition properties in subsequent times.

8. The semantics of terms for attitudinal objects

Attitudinal objects, I have argued, can be viewed as instances of complex object-dependent properties. Thus "John's belief that Mary is happy" is the instantiation of the property of standing in the belief relation to happiness and Mary in John. For giving the formal semantics of such terms, a few more remarks are necessary.

I will now make use of the Davidsonian event semantics for verbs (which I have not adopted so far for the sake of simplicity). This means that *believe* will in fact have an additional argument position for events. Formally, the interpretation of *John's belief that* S will be either as in (77a) (describing a particular attitudinal object) or as in (77b) (describing a kind of attitudinal object, which also involves John):

(77) a. $[$*John's belief that* S$] = f(\text{John}, \lambda x[\exists e\ \text{believe}(e, x, C_1, \ldots, C_n)])$, where $<C_1, \ldots, C_n> = [S]$

b. $[$*John's belief that* S$] = \iota x[x = f_{kind}(\lambda y[\exists e\ \text{claim}(e, y, C_1, \ldots, C_n)]\ \&\ R(\text{John}, f_{kind}(\lambda y[\exists e\ \text{believe}(e, y, C_1, \ldots, C_n)])]]$

Here [ ] is the translation function. I take *f* to be the function mapping an individual and a property onto the trope that instantiates the property in the individual (or makes it true that the individual falls under the concept). Note that properties as used in this context should simply be understood as concepts, not in a realist sense. *R* is the relation that holds between an individual and a kind that has an instance of which the individual

is the subject. f_{kind} is the function mapping a property to the kind of objects that are instances of the property.

Note that f(John, λx[∃e believe(e, x, $C_1, \ldots, C_n$)]) should be the very same entity as the product of the belief state *e* such that "believe(*e*, John, $C_1, \ldots, C_n$)".

The truth conditions or more generally satisfaction conditions of attitudinal objects (with the simple kinds of content so far discussed) can now be given as follows:

(78) An attitudinal object f(a, λx[∃e R(e, x; $C_1, \ldots, C_n$)]), for an agent a, propositional constituents $C_1, \ldots, C_n$, and an attitudinal relation R, is true (satisfied) at a world w iff $<C_2, \ldots, C_n> \in [C_1]^w$.

As mentioned in Section 6.2, a sentence expressing a sequence of propositional constituents can be assigned truth (or rather satisfaction) conditions derivatively, on the basis of the satisfaction conditions of the corresponding attitudinal object. This is stated more formally below:

(79) A sentence S expressing the sequence $C_1, \ldots, C_n$ at a world and a time is true in a world w iff for any kind of attitudinal object e', e' = f_{kind}(λx[∃e R(e, x, $C_1, \ldots, C_n$)]), for some multigrade (positive) attitudinal relation R, e' is true (satisfied) at w'.

Inferences among sentences could be accounted for as follows: A sentence *S* expressing a sequence of propositional constituents $C_1, \ldots, C_n$ at a world and a time implies a sentence *S'* expressing the propositional constituents $C'_1, \ldots, C'_m$ at a world and a time iff for any world in which *S* is true, *S'* is true, which means, for any attitudinal objects *e* and *e'*, e = f(d; λx[∃e★ R(e★, x, $C_1, \ldots, C_n$)]) and e' = f(d; λx[∃e★ R(e★, x, $C'_1, \ldots,$ C'_m)]): for any world *w*, if *e* is true (satisfied) at *w*, then *e'* is true (satisfied) at *w*.

9. The semantics of special quantifiers in sentential position

We can now turn to the formal semantics of special quantifiers in sentential position, as quantifiers ranging over either attitudinal objects or kinds of attitudinal objects. The semantic analysis of special pro-sentential quantifiers will be very similar to that of special pro-predicative quantifiers in Chapter 3. First, special pro-sentential quantifiers have both a scope and a nominalization domain, the part of the sentence on which the introduction of the new entities, the attitudinal objects, is based. The nominalization domain now includes both the object position and the attitude verb. Second, special pro-sentential quantifiers will require quantification over propositional constituents $C_1, \ldots, C_n$ as well as attitudinal objects. Finally, the sentence will involve quantification over events (Davidsonian event arguments). The result is the analysis of (80a) as in (80c) based on the Logical Form in (80b):

(80) a. John claimed something interesting.
b. something interesting$_i$ (John claimed t_i)
c. $\exists x \exists n \exists C_1, \ldots, C_n (x = f(\text{John}, \lambda y[\exists e \text{ claim}(e, y, C_1, \ldots, C_n)]) \& \text{interesting}(x) \& \exists e \text{ claim}(e, \text{John}, C_1, \ldots, C_n))$

For an interpretation involving quantification over kinds we will have:

(80) d. $\exists x \exists n \exists C_1 \ldots C_n (x = f_{\text{kind}}(\lambda y[\exists e \text{ claim}(e, y, C_1, \ldots, C_n)]) \& \text{interesting}(x) \& \exists e \text{ claim}(e, \text{John}, C_1, \ldots, C_n))$

Free relative clauses like *what Mary claimed* involve the same nominalization function. Taking the denotation of (81a) to be a kind of attitudinal object, (81b) can be analyzed as in (81c):

(81) a. $[\textit{what Mary claimed } e] = \iota x[\exists n \exists C_1, \ldots, C_n (x = f_{\text{kind}}(\lambda y[\exists e \text{ claim}(e, y, C_1, \ldots, C_n)]) \& R(\text{Mary}, x) \& \exists e \text{ claim}(e, \text{John}, C_1, \ldots, C_n)))]$
b. John claimed what Mary claimed.
c. $\exists x \exists n \exists C_1, \ldots, C_n (x = f_{\text{kind}}(\lambda y[\exists e \text{ claim}(e, y, C_1, \ldots, C_n)]) \& \exists e' \text{ claim}(e', \text{John}, C_1, \ldots, C_n) \& R(\text{John}, f_{\text{kind}}(\lambda y[\exists e \text{ claim}(e, y, C_1, \ldots, C_n)]) \& x = [\textit{what Mary claimed}])$

Finally, a special pronoun such as *that* can be treated as anaphoric to an attitudinal object or kind of attitudinal object given by the context:

(82) $[\textit{John believes that}_i] = \exists n \exists C_1, \ldots, C_n (e_i = f_{\text{kind}}(\lambda x'[\exists e \text{ believe}(e, x', C_1, \ldots, C_n)]) \& \exists e \text{ believe}(e, \text{John}, C_1, \ldots, C_n))$

The analysis so far has not yet done justice to the variability of attitudinal objects that show up in certain contexts. For this purpose, it must be permitted that not all of the content of an attitude verb makes up the attitudinal relation in question, but rather part of it may just play the role of characterizing such a relation.

The fact that only part of the contribution of the predicate is taken into account should be considered an instance of the more general way in which terms for dependent concrete entities such as tropes or events can be interpreted. Thus, Kim (1976) argued that event descriptions such as *John's slow walk* might either refer to an event constituted by John's walking only, an event that happens to be slow, or to an event that is constituted both by John's walking and John's slowness. Similarly, *John's stroll* may either refer to an event constituted by John's walking, which happens to be casual, or to an event constituted by John's walking as well as "casualness." Introducing events on the basis of a (possibly complex) predicate and its arguments will thus involve a division of the content of the predicate and possibly its arguments into parts that will play a constitutive role and parts that will play a characterizing role for the event. The same will hold for tropes in general and attitudinal objects in particular.

Various kinds of divisions of content into characterizing and constitutive parts may play a role for the introduction of attitudinal objects. One kind of division that is generally available concerns attitude verbs that differ in the degree of strength of the commitment to truth, but otherwise share a particular kind of attitudinal object (*believe, doubt, disbelieve*, and *assume*). In this case, the specification of the degree of commitment to truth will not be constitutive of the attitudinal object the nominalizing expression introduces. Emphasis on the predicate or its modifiers furthermore allows attitude verbs with quite different contents to share their attitudinal object. In that case, the attitudinal object is based on some very general attitudinal relation, such as "acceptance" or "entertaining" and the modifier will be rather rich in content. Formally, this means that before an attitudinal object is introduced, a function f_c determined by the context c will map the verb onto a pair consisting of a relation modifier and a relation, so that the application of the relation modifier to the relation is identical to the intension of the verb:

(83) For a context c, $f_c(V) = \langle m, R \rangle$, for some relation R and relation modifier m so that $[V] = mR$

(84a) can then be analyzed as in (84b) or equivalently as in (84c):

(84) a. John (finally) said what Mary has (always) believed.

b. $\exists nC_1, \ldots, C_n(\exists e\ pr_1(f_c(\textit{said}))(pr_2(f_c(\textit{believes}))(e, \text{John}, C_1, \ldots, C_n))] \ \&\ f_{kind}(\lambda y[\exists e\ pr_2(f_c(\textit{said}))(e, y, C_1, \ldots, C_n)]) = [\textit{what Mary believes}] \ \&\ R(\text{John}, f_{kind}(\lambda y[\exists e\ say(e, y, C_1, \ldots, C_n))]))$

c. $[\textit{what Mary believes}] = \iota x[\exists C_1, \ldots, C_n(x = f_{kind}(\lambda y[\exists e\ pr_1(f_c(\textit{believes}))(e, y, C_1, \ldots, C_n)]) \ \&\ pr_2(f_c(\textit{believes}))(pr_1(f_c(\textit{believes}))(x, C_1, \ldots, C_n))]$

Here $pr_1(f_c(V)$ is the first projection of $f_c(V)$, the modifier of the relation, and $pr_2(f_c(V))$ is the second projection, the relation itself.

10. Cognate objects and special quantifiers

Special quantifiers, on the analysis I have given, act like nominalizations in that they introduce a "new" domain of objects, even though they themselves do not act as referential terms like the familiar sorts of explicit nominalizations. With *that*-clause-taking attitude verbs, special quantifiers introduce attitudinal objects or kinds of attitudinal objects, the products of the act or state described by the verb. It appears that certain non-special NPs may play a very similar semantic role in one particular part of construction, namely as *cognate objects*. Cognate objects are NP-complements that generally occur with intransitive verbs, as below:

(85) a. John jumped a high jump.
b. John lives a good life.
c. John screamed a terrible scream.
d. Mary danced a nice dance.

Cognate objects are complements that seem to spell out the very same event that the verb describes. In fact, a common approach to cognate objects is that they play the role of making explicit the implicit Davidsonian event argument of the verb (cf. Moltmann 1989, Mittwoch 1998).

There are problems, however, with this view about the semantic role of cognate objects. First, a cognate object may describe a trope rather than an event, for example a smile, which would not be a Davidsonian event argument:

(86) John smiled a beautiful smile.

Moreover, cognate objects are restricted to product nominalizations and impossible with action nominalizations, as is illustrated below:[40]

(87) a. ??? John jumped intense jumping.
b. ??? John screamed terrible screaming.
c. ??? Mary danced nice dancing.

Finally, cognate objects are also possible with certain transitive verbs that may take *that*-clause complements, such as *think* in (88a) and *dream* (88b), and in such a case, the cognate object describes an attitudinal object, an object that has truth or satisfaction conditions:

(88) a. John thought an interesting thought.
b. John dreamt a nice dream.

The modifiers *interesting* and *nice* in (88) are predicates of the product, not the act: *interesting* in (88a) is predicated of the content of John's thought, not his act of thinking, and *nice* in (88b) is predicated of the content of John's dream, not his dreaming.

Cognate objects of this sort can be replaced by special quantifiers. Thus, the questions below can have (88a) and (88b) as answers:

(89) a. What did John think?
b. What did John dream?

By contrast, such questions are not possible with other cognate objects, which instead require *how*-questions. Thus, the question corresponding to (85a) is (90a), not (90b):

(90) a. ?? What did John jump?
b. How did John jump?

Unlike special quantifiers, which can replace *that*-clause complements of any attitude verb, the cognate-object construction is restricted to particular lexical verbs (and

[40] The claim that cognate objects are restricted to product nominalizations can be found already in Twardowski (1912).

languages differ in what verbs may take cognate objects). The nominalizations *belief, claim*, and *imagination*, for example cannot act as cognate objects. Verbs thus must be specified in the lexicon as to whether they take cognate objects or not. Setting this difference aside, the semantics of pro-sentential special quantifiers and of cognate objects is almost the same. Thus, cognate objects in the place of sentential complements take both a scope and a nominalization domain, as in (91a) (for (88a), and they introduce tropes on the basis of the nominalization domain as in (91b):

(91) a. An interesting thought$_i$ [$_{ik}$ John thinks t_k]
b. $\exists x\ \exists n\ \exists C_1, \ldots, C_n(\exists e(\text{think}(e, \text{John}, C_1, \ldots, C_n)\ \&\ x = f(\text{John}, \lambda y[\exists e(\text{think}(e, y, C_1, \ldots, C_n))])\ \&\ \text{interesting}(x))])$

Other cognate objects will simply involve the function *prod* mapping an event onto a product, as in the analysis of (85a) in (92):

(92) $\exists e \exists x(\text{jump}(e, \text{John})\ \&\ x = \text{prod}(e)\ \&\ \text{jump}(x)\ \&\ \text{high}(x))$

The cognate-object construction thus serves to characterize the product–event relation, and in particular permits modifiers of cognate objects to act as predicates of products, rather than the Davidsonian event argument. Cognate objects thus introduce the very same sorts of entities as special quantifiers, though by means of an explicit nominalization.

To summarize, cognate objects do not have the semantic role of adjuncts, acting as predicates of the event argument of the verb, and they do not have the semantic role of ordinary complements either, providing an argument of the relation expressed by the verb. Rather they are "nominalizing complements": they have the function of introducing a new entity on the basis of their nominalization domain, namely the product of the event or state described by the verb.

11. *That*-clauses and measure phrases

That-clauses share a range of similarities with measure phrases, as do nominalizations of attitude verbs such as *thought* with nominalizations of measure verbs such as *weight*. In fact, some philosophers, for purely philosophical reasons, have proposed that propositional attitudes should be understood in measure-theoretic terms, a view that goes along with a functional account of attitudinal states. This is the Measurement Theory of propositional attitudes (cf. Matthews 1985, 2007). The Measurement Theory need not make use of propositions and amounts to a non-relational account of propositional attitudes. Given the present context, this raises the question whether the Measurement Theory might not provide a semantic alternative to the neo-Russellian analysis of attitude reports, to account for the linguistic problems for the Relational Analysis.

On the Measurement Theory of propositional attitudes, attitude reports describe relations between an attitudinal state or act and a proposition or sentence. Within this theory, crucially, the proposition or sentence only serves to represent certain properties of the attitudinal state or act, such as its entailment relations with respect to other states, its truth conditions as well as any aboutness relations it may stand in to external objects. Technically, this means that attitude verbs express a measure function mapping attitudinal states or acts to sentences or propositions, while preserving the relevant semantic properties and relations. That is, they specify homomorphisms between an empirical system (attitudinal states and certain of their properties and relations) and a representation system (propositions or sentences and their semantic properties and relations). On this view, propositional attitudes are not genuine relations (which could be established on the basis of empirical properties of objects), but relations based on a stipulation as to the choice of the "representation system," a system which only serves to represent certain empirical properties of the measured entity.

While the Measurement Theory as such is a theory about the nature of propositional attitudes and not the semantics of attitude reports, it does raise the question of its potential linguistic adequacy and of the linguistic parallels between attitude reports and measure constructions. Let us first take a closer look at the semantics of measure constructions. Measure phrases occur as complements of measure verbs, as in (93a), and measure verbs allow for nominalizations, with a degree phrase as complement, as in (93b):

(93) a. John weighs 100 pounds.
b. John's weight (of 100 pounds)

Several linguistic criteria show that measure phrases such as *100 pounds* in (93a) do not act as referential arguments, but more like (obligatory) adjuncts (Rizzi 1990). They do not allow for passivization and, like adjuncts, cannot be extracted from "weak islands," for example *that*-clauses in the scope of negation. Thus, the contrast between the ambiguous (94a) and the unambiguous (94b), with an adjunct, corresponds to the contrast between (95a) and (95b) (which can be understood only as a question about an object, not a measurement) (cf. Rizzi 1990):

(94) a. It is for this reason that I believe that he was fired t.
b. It is for this reason that I do not believe that he was fired t.

(95) a. What do you believe he weighed t? (possible answer: 100 kilos)
b. What do you not believe he weighed t? (impossible answer: 100 kilos)

Measure phrases also exhibit the Substitution Problem, though they are of course replaceable by special quantifiers and pronouns:

(96) a. ??? John weighed the same number/entity /degree as Mary.
b. John weighed what Mary weighs.

c. Bill weighs that too.
d. John weighs the same as Mary.[41]

This is evidence that the measure phrase does not provide an argument of a relation expressed by the measure verb (a number, say). A measure verb in fact could not really express a relation. A measure verb on its own cannot denote a function from individuals (or rather tropes such as weights) to numbers, but rather such a function must be partly specified by part of the content of the measure phrase as well ("pound," as opposed to "kilo"). Moreover, the contribution of the measure phrase cannot just be an entity as an argument of a relation expressed by the verb: it specifies both a function and a value of the function. This indicates that both the measure verb and the measure phrase are syncategorematic expressions, forming a complex predicate expressing a measure property.

NPs such as *John's weight* were discussed already in Chapter 2 as NPs referring to quantitative tropes. A measure phrase such as *a hundred pounds* in *John's weight of 100 pounds* then serves to measure the trope, rather than specifying a degree to which the entire NP would refer to.

Measure verbs display an action–product distinction, parallel to the distinction between mental states or events and their products, that is, attitudinal objects (tropes of a complex sort). "John's weighing 100 pounds" is a state, whereas "John's weight," the product, is a trope. Only the trope has a measurement, the event does not. While *John's weight of 100 pounds* is fine, *John's weighing of 100 pounds* is not.[42] Furthermore, only the tropes enter similarity relations that go along with a shared measurement, events and states do not. Thus, (97a) is fine and possibly true, but not (97b), which could only be false:

(97) a. John's weight last year is the same as John's weight this year.
b. John's weighing 100 kilos this year is the same as John's weighing 100 kilos last year.

Attitude verbs and measure verbs thus share two properties: that of taking a non-referential complement and that of having a nominalization that is trope-referring, rather than event-referring. Given these parallels between measure constructions and attitude reports, it appears that the Measurement Theory might provide an interesting alternative way of explaining some of the relevant data, while being based on entirely different philosophical assumptions about propositional attitudes and mental states than the neo-Russellian account. However, there are two problems for the Measurement Theory when applied to the semantics of attitude reports.

[41] Note that measure verbs do not allow the full form *the same thing* as complement:

(i) ??? John weighs the same thing as Mary.

Measure verbs thus are not entirely parallel to attitude verbs in their ability to accept special quantifiers. Why that is so remains to be explained.

[42] A measurement theorist of propositional attitudes will relate this to the fact that only the attitudinal object has truth conditions, a corresponding event or act does not.

First, *that*-clauses do not exhibit the linguistic properties of measure phrases. Measure phrases generally resist passivization and extraction from weak islands (Rizzi 1990). However, both are fine with *that*-clauses:

(98) a. * Three hundred pounds has never been weighed by anyone.
b. That John is incompetent has never been claimed.

(99) a. * How much didn't you think that John weighed t?
b. What didn't you think that he said t?

Thus, even though both measure phrases and *that*-clauses are non-referential, they are not sufficiently similar linguistically to make a role of *that*-clauses as measure phrases plausible.

Furthermore, the Measurement Theory has difficulties accounting for the intuitive distinction between attitudinal objects and mental states or acts. On the Measurement Theory, what is mapped onto propositions is mental states and events. Mental states and events will thus be assigned truth conditions and inferential relations. This, however, is not right, as we have seen.

Thus, while there is a close similarity between "measurements" and attitudinal objects (both are monadic tropes of some sort), the Measurement Theory of propositional attitudes does not seem to do justice to the linguistic structure of attitude reports and the ontology of attitude-related objects that natural language displays, namely attitudinal objects. Thus, while there are interesting parallels between attitude reports and measure constructions, there are reasons to prefer the neo-Russellian analysis of attitude reports together with the particular role of attitudinal objects in the semantics of special quantifiers.

12. Conclusion

In this chapter, I have argued that the semantics of attitude reports does not require propositions as objects of reference. However, attitude reports do involve proposition-like objects in the presence of nominalizing expressions, such as special quantifiers. However, these are concrete objects that depend both on a particular mental or illocutionary event and an agent. That is, they are attitudinal objects. Attitudinal objects are involved, though, in simple attitude reports without nominalizing expressions. For those I have proposed a neo-Russellian analysis, though for entirely different reasons from those which had motivated Russell originally.

Given the best option of how to understand attitudinal objects, namely as quasi-relational tropes, the semantic importance of attitudinal objects also gives further support for tropes as a central category of objects in the ontology of natural language. The difference between attitudinal objects and mental or illocutionary events is part of a more general distinction between what Twardowski called "actions" and "products," a distinction I will make use of in the next chapter as well.

5

Intensional Transitive Verbs and their "Objects"

We have seen that attitudinal objects play an important role in the semantics of attitude verbs. Attitudinal objects such as "John's thought that S" or kinds of them such as "the thought that S" are precisely the sorts of things that special quantifiers such as *something* range over when they are the complements of attitude verbs. This conforms with the Nominalization Theory of special quantifiers. Given that theory, special quantifiers range over the same sorts of things that can act as the referents of the relevant nominalizations, such as *John's thought that* S or *the thought that* S. These nominalizations describe the "products" of attitudes, rather than attitudinal actions or states.

This raises the question of the semantics of special quantifiers when they are the complements of intensional transitive verbs, that is, verbs like *need, look for, buy, own*, and *recognize*, intensional verbs that take NPs as complements, rather than clauses.

Intensional transitive verbs display the distinction between actions and products just like verbs that take clausal complements. Thus, there is a distinction between a state of needing and a need, an act of promising and a promise, an act of buying and a purchase, and an act of recognizing and a recognition. Given the Nominalization Theory, one would expect that special quantifiers should range over such products. We will see, however, that special quantifiers with intensional transitive verbs do not generally range over products (or kinds of them), but rather over more derivative entities. These are what I will call *variable satisfiers*. Variable satisfiers are entities that can be obtained from a product such as a particular need or promise and a concept (or a kind of product and a concept).

Variable satisfiers are a particular sort of variable object in the sense of Chapter 2. Variable objects are entities associated with a function, mapping circumstances to their manifestations in those circumstances. Variable satisfiers are variable objects associated with a function mapping a situation satisfying a product, let us say a particular need or promise, onto an object that in that situation fulfills the conditions imposed by the need or promise.

The generalization that special quantifiers with intensional transitive verbs range over variable satisfiers is supported by various empirical generalizations, in particular generalizations as to when two intensional verbs can share their "object," that is, share the semantic values of special quantifiers in place of their complement.

Variable satisfiers are involved not only in the semantics of special quantifiers with intensional transitive verbs. To an extent, they can also be the referents of ordinary NPs, namely definite NPs of the sort *the assistant John needs*.

I will first discuss the role of special quantifiers in relation to three different semantically distinguished types of intensional transitive verbs. I then present the crucial generalizations about the "sharing" of objects by different intensional verbs and introduce the notion of a variable satisfier. Finally, I will discuss the applicability of the account to some further types of intensional verbs.

1. Intensional transitive verbs and special quantifiers

Transitive intensional NP verbs characteristically take NPs as complements that display a special, intensional interpretation.[1] *Need* is a typical example of an intensional transitive verb:

(1) a. John needs a horse.

The complements of intensional transitive verbs are, like predicative and clausal complements, non-referential complements, and like predicative and clausal complements, they can be replaced by special quantifiers such as *something, everything, several things*, and *the same thing*, without change in the acceptability or the meaning of the sentence. Thus, the inference from (1a) to (1b) is valid:

(1) b. John needs something.

Intensional transitive verbs also allow for special anaphora such as *that* (as opposed to "non-special" anaphora like *it, him*, or *her*):

(2) John needs a very good secretary. Bill needs that/??? it/??? her too.

Let me call the entities that special quantifiers range over or special anaphora stand for with intensional transitive verbs *the objects of intensional transitive verbs*.

The main question this chapter is about concerns the nature of the objects of intensional transitive verbs. On standard approaches, special quantifiers with intensional transitive verbs range over intensional quantifiers or properties, and intensional transitive verbs take intensional quantifiers or properties as arguments. Such approaches would fall under the Abstract Meaning Theory of special quantifiers, which goes along with the Relational Analysis of the embedding verb. Intensional transitive verbs provide similar arguments against the Abstract Meaning Theory and in favor of the Nominalization Theory of special quantifiers as we have seen with copula verbs and with attitude verbs taking clausal complements. Moreover, intensional transitive verbs

[1] There are also intransitive verbs that allow for an intensional reading of a subject, for example *lack* and *is missing*. The discussion to follow will cover those predicates as well.

provide the same arguments against a Relational Analysis as we had seen with verbs taking predicative complements and verbs taking clausal complements.

However, special quantifiers and pronouns with intensional transitive verbs do not allow for a straightforward application of the Nominalization Theory of special quantifiers and pronouns. On the Nominalization Theory as it stands, special quantifiers with intensional transitive verbs should range over the kinds of entities that definite NPs with the corresponding nominalizations refer to, such as in (1b) "John's need for a horse" or "the need for a horse." That is, special quantifiers with intensional transitive verbs should range over the products of the event or state described by the verb. But special quantifiers with intensional transitive verbs do not in fact range over the products of the described state or event. Rather, they range over entities that play the role of possible satisfiers of those products or kinds of products. This means, for example, that *something* in (1b) does not range over entities like "the need for a horse," but entities that one may describe roughly as "the satisfaction of the need for a horse." I will call the entities that special quantifiers with intensional transitive verbs range over *variable satisfiers*.

1.1. Verbs of absence and verbs of possession

The particular behavior of special quantifiers with intensional verbs is one of the marks of truly intensional transitive verbs. In order to discuss the behavior of special quantifiers with intensional transitive verbs, let me start with a brief discussion of criteria for intensionality in the sense relevant for intensional transitive verbs of different types.

For the main part of this chapter, I will focus on four different kinds of intensional transitive verbs:

[1] Verbs of absence such as *need* and *look for*
[2] Verbs of possession (and transaction) such as *own, owe, buy*, and *sell*
[3] Epistemic verbs such as *recognize*
[4] Verbs of nomination such as *hire*.

These four kinds of verbs involve different criteria for intensionality and somewhat different, though related, semantic interpretations. The distinction into four kinds does not capture all intensional transitive verbs. At the end of this chapter, I will discuss two further classes of intensional transitive verbs, verbs of creation such as *paint* and *imagine* and verbs of perception such as *see*. Their semantics appears more fundamentally different from that of the four classes of intensional transitive verbs that this chapter focuses on.

Special quantifiers and pronouns play an important role for the criteria for intensional transitive verbs, but the criteria of intensionality for the four classes of intensional transitive verbs are somewhat different.

I will start with verbs of absence. There are two criteria that are sometimes mistakenly used as criteria for the intensionality of transitive verbs: apparent reference to nonexistents and the failure of substitutivity of co-referential terms or co-extensional predi-

cates. According to those criteria, transitive verbs like *think of, worship*, and *admire* classify as intensional verbs.[2] These criteria, however, are not suited for the class of intensional transitive verbs of absence, nor are they suited for other intensional transitive verbs.

The mark of intensional transitive verbs of absence is a particular form of nonspecificity (Moltmann 1997, Zimmermann 2001, Forbes online). This form of nonspecificity can be indicated by the addition of *any will do*:[3]

(3) a. John is looking for an assistant, any will do.
b. John needs a horse, any will do.
c. John wants a picture of Mary, any will do.

With verbs of absence, the complement contributes to the characterization of the *conditions of the satisfaction* of the "need," the "search," the "desire," and so on, that is, the satisfaction of the product of the state or event described. The nonspecificity criterion indicates that it is, to an extent, arbitrary which object satisfies such a product.

The criterion of nonspecificity identifies as intensional also transitive verbs of possession and change of ownership, such as *own, possess, owe, offer*, and *buy*:

(4) a. John owns half of the estate (but no specific half).
b. John offered Mary a glass of wine (before opening the bottle).
c. John just bought a case of wine (which will be delivered later that week).
d. Mary accepted a glass of wine (before John poured her one).

Here the *any will do*-test is not applicable though. Verbs of possession are not satisfaction directed, but describe events or states that have, one may say, *realization conditions*. Any half of the estate will "realize" John's ownership of half of the estate.

Clearly, for verbs of possession, apparent reference to non-existents and failure of substitutivity could not be considered criteria for their intensional status: the complement generally presupposes a non-empty domain of quantification, and substitution of co-extensional predicates certainly goes through.[4]

[2] It is in fact questionable whether verbs like *think of* and *worship* should classify as intensional transitive verbs, requiring a distinct semantics from that of extensional verbs. They might rather classify as extensional verbs able to take intentional objects as arguments, which can explain apparent reference to non-existents and failure of substitutivity (Moltmann 2008).

[3] This test does not apply to completion-related verbs of absence such as *lack* or *be missing*:

(i) a. ?? The door lacks a handle, any will do.
b. ?? A screw is missing, any will do.

The reason appears to be that verbs of completion are not satisfaction-directed like other verbs of absence. Verbs of completion express simply a comparison between a relevant state of "completeness" and the actual state of an object (or situation).

[4] There may be cases of reference to non-existents with *buy* or *sell*, for example in the context below:

(i) John made the mistake of buying an apartment advertised on the internet, an apartment that did not in fact exist.

Also *owe* allows for that:

(ii) John owes his son a meeting with Santa Claus (since this is what he promised him).

The nonspecificity characteristic of intensional transitive verbs goes along with the particular semantic behavior of special quantifiers and pronouns. Special quantifiers can range over objects common to two occurrences of intensional transitive verbs that describe distinct intentional acts by different agents, acts that moreover may have to be satisfied by different actual entities. This is the case for *the same thing* and relative clauses with *what* in the valid inferences below:

(5) a. John is looking for an assistant.
Mary is looking for an assistant.
John and Mary are looking for the same thing.
b. John bought what Mary bought.
Mary bought a house.
John bought a house.

In (5a), two premises involve one and the same object, which will then act as the semantic value of *the same thing* in the conclusion. This is possible even if it is clear that the search will be satisfied by different entities. Similarly, in (5b) *what Mary bought* obviously stands for the very same thing as is involved in John's buying a house.

The use of special pronouns and anaphora makes the same point:

(6) a. John is looking for an assistant. Mary is looking for that too.
b. John owes Mary a bottle of wine. Bill owes her that too.

These potentially shared objects are the objects of intensional transitive verbs.[5] The objects of intensional transitive verbs more precisely are the objects that special quantifiers range over when taking the position of a complement of an intensional transitive verb. Of course, they are also the kinds of things that special anaphora stand for when acting as complements of intensional transitive verbs.

Another characteristic of verbs of absence, shared by the other three classes of intensional verbs, is the particular interpretation of quantificational complements (of the non-special sort). Generally, quantificational complements of intensional transitive verbs receive an "external" interpretation, that is, they do not generally specify part of the "content" of the state or event in question, but rather characterize situations in which the "need" or "search" is satisfied:

(7) a. John needs at most two assistants.
b. John needs to have at most two assistants.

(8) a. John promised exactly two papers.
b. John promised to write exactly two papers.
c. John promised that he would write exactly two papers.

[5] In Moltmann (2008), I called such objects "intentional objects." This is not a fortunate choice of a term, however, since "intentional objects" are traditionally taken to be the particular objects of object-related attitudes such as *think of* or *imagine*, that is, attitudes described by intentional verbs, not intensional verbs.

(9) a. John bought at most two bottles of wine.
b. John offered Mary at least two bottles of wine.

(7a) says that in a situation in which John's needs are satisfied, John has at most two assistants (which makes it compatible with John in fact not needing any assistant). By contrast, (7b) means, at least preferably, that in a world in which John's needs are satisfied, John has at most two assistants (which makes it incompatible with John not needing any assistant). Similarly, (8a) means that in a situation in which John's promise is satisfied, John writes exactly two papers (which allows him to write in fact three papers). By contrast, (8b) and (8c) mean that in a world in which John's need is satisfied, John writes exactly two papers (and thus if John writes three papers he will no longer satisfy his promise).[6] Let me call the reading of the quantifiers in (7a) and (8a) the *external reading*, and the reading of the quantifiers in (7b), (8b) and (8c) the *internal reading*. Verbs of possession as in (9a, b) clearly allow only for an external reading.

1.2. Epistemic verbs

Epistemic intensional transitive verbs involve quite different criteria of intensionality. *Recognize* is an example of an epistemic verb that can be used intensionally, as below:

(10) a. John recognized a great talent when talking to his wife.

The mark of the intensional status of epistemic intensional transitive verbs is not any form of nonspecificity, but rather failure of existential quantification and of substitutivity. Thus, (10a) does not imply (10b) or (10c):

(10) b. John recognized his wife.
c. There is a great talent x, John recognized x.

Count is another, rather special, epistemic verb. It is used intensionally below:

(11) John counted nine when counting the ten students.

Count has the peculiarity of requiring a numeral as its complement when displaying the intensional reading.

In addition, *find* has an intensional reading as an epistemic verb, for example below:

(12) John found a great talent when talking to his wife.

Epistemic intensional transitive verbs do not display the relevant sort of nonspecificity because they do not involve any form of arbitrariness of satisfaction or realization. Instead, they involve predication of the property given by the complement in an epistemic act. This is why they exhibit failure of substitution of co-extensional complements as well as failure of existential quantification.

[6] The relevant contrast is stronger between (8a) and (8c), with a tensed clause, than between (8a) and (8b).

Some intensional verbs of absence can also be used as epistemic intensional verbs. This holds in particular for *look for*, for example in (13) when it precedes (12):

(13) John is looking for a great talent.

In fact, the failure of substitutivity with psychological verbs of absence such as *look for* can be traced to the additional epistemic reading such verbs may carry.

Clearly, the complement of an epistemic intensional verb has a predicative function. However, unlike with a verb of nomination, it has a predicative function within an epistemic act. This means that what is predicated is not necessarily just a property, but may be something hyperintensional (a property together with a mode of presentation, let us say).

As with verbs of absence and of possession, a quantified complement of an epistemic intensional verb generally has an external interpretation specifying the number of particular epistemic acts that are performed, rather than a particular part of a constituent of the content of an epistemic state:

(14) John recognized at least two great talents when doing the talent scout (in fact he recognized exactly three great talents).

1.3. Verbs of nomination

Verbs of nomination involve the attribution of a property as part of a change in status described by the verb. The verb *hire* has an intensional reading in (15a), meaning something like (15b):

(15) a. John hired an assistant.
b. John hired Sue as an assistant.

In addition, *find* can have an intensional reading as a verb of nomination:

(16) a. John found an assistant.

(16a) is not equivalent to "there is an x and John found x"; rather John's finding an assistant consists in John's making someone his assistant.

This also holds for *look for*. More precisely, *look for* can have two intensional readings at once: as an intensional verb of absence and as an intensional verb of nomination, as below:

(16) b. John is looking for an assistant.

Look for in (16b) is a verb of absence by allowing a certain arbitrariness of situations of satisfaction, and it is a verb of nomination in that each such situation involves the agent making someone his assistant.

The mark of the intensionality of verbs of nomination is certainly neither nonspecificity nor failure of substitutivity, but rather failure of existential quantification. That is, (16a) does not imply (16c):

(16) c. There is an assistant x, John found x.

Again, like the complement of verbs of absence and epistemic verbs, quantificational complements of verbs of nomination exhibit an external interpretation:

(17) John hired at least two assistants (in fact, he hired three).

Epistemic intensional verbs, verbs of nomination, as well as certain verbs of absence such as *look for* hardly allow a paraphrase using a clausal complement instead of an NP complement. This makes an analysis making use of an implicit clausal complement rather implausible. However, intensional transitive verbs may specify implicitly conditions on satisfaction or realization, and in that sense, they implicitly involve conditions of a clausal type.

The role of quantifiers in the complement of intensional transitive verbs also fails to give support for an analysis on which such verbs take properties as arguments (Zimmermann 1993). Given a more standard semantic view, we are then left with an analysis on which the complement of an intensional transitive verb provides a quantifier as the argument of the relation expressed by the verb. However, such an analysis meets a range of difficulties, as will be discussed in the next section.

2. The Relational Analysis of intensional transitive verbs

Let me start with standard analyses of intensional transitive verbs that can be found in the semantic literature. The most common semantic analyses of sentences with intensional transitive verbs fall under the Relational Analysis. On the Relational Analysis, the complement of a transitive intensional verb serves to provide an argument for the relation expressed by the verb.

Given the preceding discussion, there is only one version of the Relational Analysis that would have a sufficient generality of application to intensional transitive verbs, and that is one according to which the relation expressed by an intensional transitive verb takes an intensional quantifier as its argument (Montague 1973, Moltmann 1997). Let me call this the *Quantifier-Based Relational Analysis*—as opposed to the *Property-Based* and the *Proposition-Based Relational Analysis*.[7] On the Quantifier-Based Relational Analysis, (18a) has the logical form in (18b):

(18) a. John needs a horse.
b. *needs*(j, Q)

That is, complements (of the non-special sort) of intensional transitive verbs denote intensional generalized quantifiers, that is, functions from worlds to extensional

[7] In Moltmann (1997), I had distinguished a further class of intensional predicates, namely predicates of resemblance like *resemble, compare*, and comparatives. Such predicates do not accept quantificational complements, but only simple indefinite ones. As I had suggested in Moltmann (1997), they should receive a different semantic treatment, namely one on which they take properties as arguments.

quantifiers (semantic values of type <s, <<e, t>, t>>), or, on Montague's (1973) account, functions from worlds to functions from properties to truth values (that is, semantic values of type <s, <<s, <e, t>>, t>).

The Quantifier-Based Relational Analysis goes along with the view that special quantifiers such as *something* range over intensional quantifiers rather than individuals. This straightforwardly accounts for the validity of the inference from (18a) to (18c):

(18) c. John needs something.

Similarly, special pronouns like *that* will stand for intensional quantifiers, rather than individuals.

In fact, on the Quantifier-Based Relational Analysis, quantifiers like *something* will be ambiguous when they act as complements of intensional verbs. They may not only range over the intensional quantifiers that are potential arguments of the intensional verb, but also act as first-order quantifiers and provide their own intension as an argument of the intensional verb. This reading generally arises when the special quantifier is restricted by an adjectival modifier or relative clause. Thus, while (19a) displays the interpretation on which *something* ranges over intensional quantifiers, (19b) displays the one on which *something against headaches* provides its intension as an argument of *need*, and a sentence like (19c) is ambiguous:

(19) a. John needs something, namely a good secretary.
b. John needs something against headaches, anything will do.
c. John needs something.

Treating special quantifiers, on one interpretation, as ranging over intensional quantifiers raises serious difficulties, though. It predicts inferences such as the following to be valid:[8]

(20) a. John needs at most one assistant.
John needs something.
b. John promised nothing of interest.
John promised something.

Neither (20a) nor (20b) is valid, however. The premise of (20a) could be true even if John does not in fact need any assistant at all, in which case it is not true that he "needs something." Similarly, the premise of (20b) is compatible with John having made no promise at all, in which case it is not true that he "promised something." Let me call this the *Problem of Negative Quantifiers*.[9]

[8] See Zimmermann (2006) for a discussion of such inferences in a somewhat different context.

[9] With some intensional verbs, for example *want*, the inference does go through. In my ears, the following inference is valid, on one interpretation of the premise:

(i) John wants no distractions.
John wants something.

A somewhat related problem arises with the monotonicity properties that quantificational complements of intensional transitive verbs display, a problem discussed in great detail by Zimmermann (2006). Let me call this the *Monotonicity Problem*. The following two observations show the problem. First, with ordinary NPs, intensional verbs are upward monotone with respect to their intensional argument, that is, the inference in (21) is intuitively valid:

(21) John is looking for a green sweater.
John is looking for a sweater.

Second, with special quantifiers upward monotonicity no longer holds:

(22) John is looking for a sweater.
Mary is looking for a book.
There is something John and Mary are looking for.

Something appears possible in this context only if the complements are the same in content:

(23) John is looking for a sweater.
Mary is looking for a sweater.
There is something John and Mary are looking for.

The inference in (23) is valid, though, only if John and Mary are just looking for any sweater whatsoever.[10]

The Quantifier-Based Relational Analysis of intensional transitive verbs also faces the same two problems as the Relational Analysis of verbs taking predicative and clausal complements, namely the Substitution Problem and the Objectivization Effect. The invalidity of inferences with (24a) as premise and (24b) or (24c) as conclusion illustrates the Objectivization Effect:

The inference is valid because there is in fact a desire on the part of John, namely not to have any distraction. The verbs with which a negative quantifier characterizes the content of the actual state or act described appear to be just those that also take small clauses as complements. Perhaps this means that they require a clausal analysis at least on one interpretation (den Dikken et al. 1996).

[10] Zimmermann (2006) proposes an account within the Property-Based Relational Analysis to explain the peculiar monotonicity behavior of intensional verbs. On this account, the actual argument of an intensional verb like *look for* is not necessarily the property denoted by the NP complement, but may be a more specific property, the property that constitutes an "exact match" of the agent's search. That is, if John is in fact looking for a green sweater and this is reported as *John is looking for a sweater*, *a sweater* will only partially characterize the object of John's search. Only special quantifiers like *something* quantify over exact matches. This is reflected in the analyses below, where "look for" is the relation that is to hold between an agent and his "exact need":

(i) a. *John is looking for an* N is true iff $\exists P(P \leq N$ & look for(j, P))
b. *John is looking for something* is true iff $\exists P$ look for(j, P)

We will later see that the Modified Nominalization Theory of special quantifiers accounts for the problem as well. It does so without having to use properties as the arguments of intensional transitive verbs and without having to posit two versions of an intensional transitive verb, one overt version applying to the overt complement and one underlying version taking what is the actual argument of the verb.

(24) a. John needs a horse.
b. John needs some quantifier.
c. John needs the semantic value of *a horse*.

As we have seen, special quantifiers can replace the complements of intensional transitive verbs without leading to the Substitution Problem or the Objectivization Effect, just as in the case of predicative and clausal complements. This again indicates that intensional quantifiers as semantic values of the complement of intensional transitive verbs do not provide an argument of the relation expressed by the verb. It also shows that intensional quantifiers would not be available for special quantifiers to range over in the first place. As in the case of predicative and clausal complements, it means that (non-special) NPs as complements of intensional transitive verbs simply do not provide arguments (abstract meanings) of a relation expressed by the verb.

The Substitution Problem and the Objectivization Effect give support for the Nominalization Theory of special quantifiers. However, the Nominalization Theory will apply to intensional transitive verbs only in a modified way, namely as what I will call the *Modified Nominalization Theory*. Let us first see how the Nominalization Theory could apply to intensional transitive verbs and then look at a greater range of data that will motivate the Modified Nominalization Theory.

3. The Nominalization Theory of special quantifiers with intensional transitive verbs

3.1. Evidence for the Nominalization Theory

The Substitution Problem and the Objectivization Effect are problems of the familiar sort for the Abstract Meaning Theory of special quantifiers with intensional transitive verbs. Further evidence against the Abstract Meaning Theory is the kinds of predicates applicable to the semantic values of special quantifiers or pronouns. Thus, the sentences in (25) are not equivalent to those in (26), which, even though grammatical, would give the wrong truth conditions:

(25) a. John counted all he needed.
b. John enumerated the things he needed.
c. John described exactly what he needed.

(26) a. John counted the quantifiers that . . .
b. John enumerated the quantifiers that . . .
c. John exactly described the quantifier that . . .

Quantifiers like *all (that) he needed, the things he needed*, and *exactly what he needed* clearly do not range over intensional quantifiers, the arguments of the verb *need* on the Quantifier-Based Relational Analysis.

These observations seem to support the Nominalization Theory of special quantifiers with intensional transitive verbs. The Nominalization Theory would also straightforwardly account for the Problem of Negative Quantifiers and the Monotonicity Problem: special quantifiers with intensional transitive verbs would not quantify over intensional quantifiers, but rather over things introduced by nominalizations (and thus representing an exact match). The validity of inferences with special quantifiers will thus depend entirely on the availability of things that would be semantic values of the relevant nominalizations.

The question is, however, how would the Nominalization Theory apply to special quantifiers with intensional transitive verbs? The answer that comes to mind first is that special quantifiers when acting as complements of intensional transitive verbs range over the kinds of things that the corresponding deverbal nominalization stands for. That is, *something* in *John needs something, namely a horse* ranges over things of the sort "John's need for a horse" or else the corresponding kind "the need for a horse." Special quantifiers with intensional transitive verbs would then range over the same sorts of "products" as in the case of clausal complement-taking verbs.

One indication that special quantifiers with intensional transitive verbs quantify over things like needs is the use of measure quantifiers and predicates. *A lot* as a special quantifier acting as the complement of *need* corresponds to the predicate *great* evaluating the corresponding "need," making (27a) and (27b) roughly equivalent:

(27) a. John promised a lot.
b. John's promise was great.

But there are apparent difficulties for the view that special quantifiers with intensional transitive verbs range over things like "needs." Thus, the predicates *count, enumerate*, and *describe* in (25) do not seem to target things like "needs"; rather they apply to possible satisfiers of a "need." The restrictions that special quantifiers with intensional transitive verbs allow confirm the point:

(28) a. John needs something sweet.
b. John promised Mary something exciting, a trip to China.

According to (28a), it is the satisfier of John's need that is sweet, not the need itself, and according to (28b), it is the trip to China that is exciting, not the promise as such.

Admittedly, though, entities like needs are to an extent individuated by their possible satisfiers and appear to be able to carry certain properties of the satisfying objects. Thus, the sentences in (25) appear in fact equivalent to those below:

(29) a. John counted all his needs.
b. John enumerated his needs.
c. John exactly described his needs.

Counting and enumerating and even to an extent describing can apply to products with respect to the relevant satisfiers or with respect to the correlated event. In fact, *count, enumerate*, and *describe* display two readings with products: one focused on the correlated events, and another focused on the satisfier. For example, regarding one and the same situation of someone buying one thing in one store and two things (at once) in another store, one may correctly count or enumerate two purchases or three. This holds to an extent also for *describe*: describing the purchase may mean describing the event or describing the things bought (or both).

Moreover, certain restrictions on special quantifiers with an intensional transitive verb like *need* may be understood as predicates of the corresponding "need," even though they relate to the satisfiers of the need. This holds in particular for evaluative predicates like *unusual* below:

(30) a. John needs something unusual, namely ten maids.
b. John's need is unusual, namely his need for ten maids.

Thus, quantitatively or qualitatively evaluating a need or a promise may consist in quantitatively or qualitatively evaluating the satisfiers of the need or promise.

However, the inheritance of properties of satisfiers by the products described by intensional transitive verbs is obviously restricted. A great range of properties of a satisfier, for example properties of taste, color, or shape, cannot be attributed to the product of the described event or state (??? *a sweet need*, ??? *a red need*, ??? *a round need*). Moreover, we will see in the next section that there are conditions on the sharing of objects by different intensional transitive verbs that show that it is not generally the product that is shared, but rather possible satisfiers of the product. This does not mean that the Nominalization Theory of special quantifiers as such is wrong. But it shows that the Nominalization Theory needs to be modified in a certain way to allow special quantifiers with intensional transitive verbs not to range over the sorts of entities described by the deverbal nominalizations, but rather over more derivative sorts of entities.[11]

In the case of attitude verbs taking clausal complements, we had seen another sort of evidence against the Abstract Meaning Theory and in favor of the Nominalization Theory of special quantifiers, namely restrictions on the sharing of the propositional objects described by different attitude verbs. Intensional transitive verbs do not provide this sort of evidence for the Nominalization Theory. In fact, the conditions on the

[11] Conjunctions like (i) below might be considered problematic for this view:

(i) John needs something strange and a sweater.

However, sentences like (i) hardly sound very natural. Moreover, the phenomenon of mixed conjunctions as in (i) itself is in fact a more general one, occurring with any non-referential terms, for example predicative complements and *that*-clauses:

(ii) a. John became a baker and something else I cannot remember.
b. John said that he would leave and something very strange, which I cannot remember.

(i) thus is part of a more general phenomenon of conjunction of mixed types, rather than being a particular problem arising with intensional verbs.

sharing of objects by different intensional transitive verbs raise a range of complications, which require a significant modification of the Nominalization Theory when applied to special quantifiers with intensional transitive verbs.

3.2. Apparent problems for the Nominalization Theory

If the objects of intensional transitive verbs were products of the described event or state, this would predict that intensional transitive verbs could share their object only if those verbs were identical or of the same type, as below:[12]

(31) John needs the same thing Mary needs, namely a house.

In (31), the *same thing* could stand for "the need for a house."

This means that extensional and intensional verbs should not be able to share their object. However, actually, they are able to, given valid inferences such as (32a) and (32b):

(32) a. John buys whatever (the thing/those things) he needs.
John needs a car.
John buys a car.
b. John needed a car.
John bought a car.
John bought what he needed.

The validity of such an inference in fact seems to support a Montagovian account on which both intensional and extensional verbs take intensional quantifiers as arguments, with meaning postulates on intensional verbs ensuring the right truth conditions (Montague 1973).

Also, two quite different intensional verbs may share their object:

(33) a. John promised Mary only what she really needed, namely a car.
b. Mary needs what she lacks.

(34) a. John promised Mary what Sue really needs, namely a car.
b. John himself lacks what Mary needs.

Here the corresponding nominalizations could not refer to the same type of entity: a promise is not a need, and a need is not a lack.

Even though the conditions on sharing of the objects of different intensional verbs do not seem to support the Nominalization Theory, we will see that there is in fact a

[12] Intensional verbs of nomination like *hire* do not accept *the same thing* under the circumstances under which intensional verbs of absence do. Thus the following sentence is unacceptable:

(i) ??? John hired the same thing as Mary, namely an assistant.

The same also holds for epistemic verbs:

(ii) ??? Talking to Bill, John recognized the same thing as Mary, namely a genius.

significant range of data that reveal constraints on when objects can be shared by different verbs. These data ultimately support the Nominalization Theory once this theory is modified in a certain way.

3.3. Extensional and intensional verbs sharing their object

In fact, not all extensional–intensional verb pairs can share their object. The following inference, for example, is intuitively invalid:

(35) Mary needs a book.
John read a book.
John read what Mary needs.

That this inference is invalid is actually not entirely right. There is a reading on which (35) is valid, though intuitions are a bit fluctuating. The reading in question involves coercion (and is in fact accompanied by the "feel" of coercion), namely semantic type shift from the semantic type of singular indefinites to the type of bare plurals. Bare plurals, recall, are semantically of the type of "kinds" in the sense of Carlson (1977). This means that the intensional type of *a book* in the first premise of (35) and the extensional type of *a book* in the second premise of (35) are shifted to the type of the bare plural *books*. Recall from Chapter 1 that bare plurals provide arguments for both extensional and intensional verbs, allowing for intensional, extensional, generic, as well as kind readings.

The type-shifting account of the validity, on one reading, of the inferences in (35) is supported by the validity, on any reading, of the corresponding inference with bare plurals:

(36) Mary needs books.
John reads books.
John reads what Mary needs.

In general, intensional and extensional verbs do not permit inferences such as (35). Further examples illustrating the impossibility of sharing are those below:

(37) a. ?? John drank what Mary needs, a glass of water.
b. ?? John destroyed what Mary was looking for, a bookshelf.
c. ?? Mary found what John had corrected, a mistake.

On the relevant readings on which they are unacceptable, (37a) should simply say "John drank a glass of water, and Mary needs a glass of water," (37b) "John destroyed a bookshelf, and Mary built a bookshelf," and (37c) "Mary found a mistake, and John corrected a mistake." Those examples are acceptable of course on one reading, the one involving type coercion.

There is at least one intensional verb that cannot share its object with an extensional verb on any reading because it does not allow for type coercion This is the verb *count*. *Count* has an intensional reading in examples like (38):

(38) There were nine students in the class, but John counted ten students.

That the intensional *count* cannot share its object with an extensional verb can be seen from the following sentence, which can never mean something like "John counted ten people, and Mary met ten people":

(39) ??? John counted what Mary met.

Why is (39) (as opposed to (37a, b, c)) never good? The reason is that type coercion in this case is impossible. No kind argument could be made available because intensional *count* requires a quantificational NP (with a weak quantifier) and does not accept bare plurals. Note that no intensional reading is available in (40):

(40) John counted men.

The case of intensional *count* constitutes a rather compelling argument for the coercion account of the validity of (35) and the acceptability of (37a, b, c) on the relevant reading.[13]

The second problem for the Montagovian account of the validity of (32a, b) is that extensional verbs do not allow for special quantifiers in the way intensional ones do. The following examples are unacceptable:

(41) a. ??? John met what Bill is looking for, namely a rich heiress.
b. ??? John talked to what Bill needs, namely an assistant.

The same observations can be made for kind-denoting NPs:

(42) a. ??? John met what Bill met, local politicians.
b. ??? John met something, namely local politicians.

That is, coercion is impossible with special quantifiers, which is the reason why a second reading of (42a–b), on which the examples are acceptable, is not available.

A third problem for the Montagovian account is that two extensional verbs cannot share their object if they involve distinct arguments:

(43) a. ?? John ate the same thing that Bill ate, namely a piece of cake.
b. ?? John bought what Bill destroyed, namely a car.

(43b) is not natural on a reading on which the car John bought is distinct from the car Bill destroyed. (Even such cases, though, allow for one reading, namely the reading based on type coercion, accompanied by the usual feeling of effort associated with

[13] One question the type-shifting account raises is, why is type-shifting of the type of a singular indefinite to the type of a kind-denoting bare plural not available in the context of proper kind predicates such as *widespread* or *extinct*? Thus the following examples are impossible:

(i) a. ??? A lion is widespread.
b. ??? A lion is extinct.

The reason might be the plural requirement of those predicates. Perhaps the kinds that singular indefinites may denote under type-shifting provide only individuals as instances, not collections.

coercion.) On that reading, (43a) is synonymous with "John read the same thing as Bill, namely books," and (43b) with "John bought what Bill destroyed, namely cars."

Given the restrictions on the sharing of objects with extensional and intensional verbs (setting aside readings with coercion), the question is, under what circumstances can extensional and intensional verbs share their object, rendering arguments like (32a, b) valid? Let us take the conclusion of (32b), repeated below:

(44) John bought what he needed, a car.

The main clause of (44) describes an act of purchase that results in a situation of John having a car. This situation is also a situation that satisfies "John's need," as described in the relative clause. "John's need" is of course the product of the state of needing, the implicit argument of *need*. The concept of a situation satisfying the product of a state or event plays a crucial role in the condition on sharing.

Note, though, that in (44) the verb *buy* does not directly describe the appropriate situation, but rather describes an act that results in a situation satisfying the need.

Other cases of sharing with extensional and intensional verbs are of the same sort:

(45) a. John has what he needs.
b. John now has what he lacked.
c. Mary got what she wanted.
d. John gave Mary what he had promised her, a book.

In (45a) and (45b), the extensional verb *have* describes directly situations satisfying the need and the lack respectively. In (45c), again the resulting situation of the event described by the extensional verb is a satisfier of the desire or promise. In (45d), the situation that satisfies the promise will have to be the more complex situation described by the main predicate, the situation of John giving Mary a book.

Thus, what underlies the sharing of objects of extensional and intensional verbs is that the situation described by the extensional verb (or resulting from the event described by the extensional verb) is a satisfaction situation of the product of the event or state described by the intensional verb.

In (45a–d), a particular situation specified by the extensional verb serves as a satisfaction situation of the product of the event argument of the intensional verb. However, sharing is possible also if the situation specified by the extensional verb is just of the *type* of a situation that satisfies the product of the event argument of the intensional verb. Here are some cases:

(46) a. John bought what Mary really needs, a big car. (But John did not buy it for her.)
b. John has what every child needs, a stable home.
c. John got what his grandfather always dreamt of, namely a Ferrari.

In (46a), not the particular situation specified by the extensional verb is a satisfaction situation for John's needs, but rather a situation that belongs to the same type as the situation that the extensional verb specifies. That is, it is not John's having a big car that is a satisfaction situation of Mary's need, but rather a situation that belongs to the type of situation in which someone or other has a car. In (46b), the situation of John having a stable home is of a type some instance of which satisfies any child's need. (46c) also involves a type of situation: it is not John's buying a Ferrari that could be the satisfaction situation of his grandfather's dreams, but rather a situation of the same type, a situation that would have occurred at an entirely different time under different circumstances. For the sake of simplicity, I will ignore the role of time for satisfaction situations and formulate the semantics of special quantifiers while setting time-related concerns aside.

The conditions on when extensional and intensional verbs can share their object are thus the following:

[1] The extensional verb specifies a situation that is (closely related to) a satisfaction situation of the product of the state or event described by the intensional verb.
[2] The extensional verb specifies a situation that is of the type of situation that also satisfies the product of the state or event described by the intensional verb.
[3] Coercion takes place, that is, type shift of special quantifiers from the type of semantic values of nominalizations to that of kinds. Kinds will then act as arguments of the two verbs.

3.4. Two intensional verbs sharing their object

Also two different types of intensional verbs can share their object. The conditions are similar to those of an intensional and an extensional verb. Two intensional verbs can share their object when a possible satisfaction situation of the one will also be a possible satisfaction situation of the other, as in (47a, b):

(47) a. Mary needs what she lacks, a car.
b. John promised Mary only what she really needed, namely a car.

In (47a), a situation satisfying Mary's "lack" will also be a situation satisfying Mary's need. In (47b), a situation satisfying John's promise would be a situation in which John gives Mary a car. In fact, such a situation is not exactly one that satisfies Mary's need, but rather a situation normally resulting from a situation of that sort, a situation in which Mary has a car.

Instead of sharing specific possible satisfaction situations, the two intensional verbs may also share just a type of situation, different instances of which would satisfy the products of the event arguments of those verbs. This is the case below:

(48) a. John himself lacks what Mary needs, a car.
b. John promised Mary what she demanded, a new car.
c. John promised Mary what Sue really needs, namely a car.

In (48a) the type of shared situation is someone's having a car. This is also the shared type of situation in (48b), though here an instance of that type is not itself a satisfaction situation of the promise, but rather the result of a situation satisfying the promise (someone giving Mary something).

Sharing is possible also with other intensional verbs. Here are some examples of sharing with two epistemic verbs:

(49) a. John found what Mary found, a great talent.
b. When talking to Julie, John recognized what Mary recognized, a great talent.

Of course, satisfaction situations for all epistemic states are different from the satisfaction situations discussed so far in that they consist in an epistemic act of predicating a property of an object. As a result, epistemic verbs cannot share their objects with non-epistemic intensional verbs:

(50) a. John needs what Mary recognized, a great talent.

Also, *look for* used as an epistemic verb can share its object with epistemic *find*:

(50) b. Having talked to his wife about mathematics for the first time, John found what he was looking for, a great talent.

In (50b), it is the situation of recognition resulting from the finding that is a situation satisfying the search.

Also two verbs of nomination can share their object:

(51) a. John hired what Bill hired, a good secretary.

In particular, *find* and *look for* as verbs of nomination can share their object:

(51) b. John found what he was looking for, an assistant.

In (51b), the situation resulting from the nomination is a situation satisfying the search.

As expected, a verb of nomination cannot share its object with an epistemic verb:

(52) ?? John found what Bill recognized, a great collaborator.

This is, of course, because verbs of nomination involve satisfaction situations of a very different type than epistemic intensional verbs.

Also, intensional verbs of possession can share their object, either by sharing a particular satisfaction situation or a type of satisfaction situation:

(53) a. He accepted what I offered him (namely a glass of wine; but before I could pour him one, a fire broke out).
b. On the internet, John bought what Bill bought, a bottle of wine.
c. John already owns what Mary just bought, namely half of the estate.

Intensional verbs of possession can also share their object with verbs of absence:

(54) John offered Mary what she needed, a drink. (But she actually never got one.)

Here a situation of satisfaction of the offer (John's giving Mary a particular glass of wine) normally results in a situation of Mary's having a drink, which is a satisfaction situation of Mary's need.

It appears that the ability of verbs of possession to have an intensional reading is also what allows extensional and intensional verbs to share their object. Looking at the various acceptable examples of extensional and intensional verbs sharing their object, it appears that in all those cases the extensional verbs themselves are verbs of possession (such as *buy, give*, and *have*), that is, verbs that in principle can have an intensional (nonspecific) reading. By contrast, no sharing seems possible with verbs that lack an intensional reading, such as *read, drink*, and *destroy*:

(55) a. ?? John read what he wanted, a good book.
b. ?? John drank what he needed, a glass of wine.
c. ?? John destroyed what Bill had promised Mary, a statue.

In all of the examples discussed, the situations at play belonged to a limited set. They were either situations of someone "having" an object or someone giving another an object, or else predicational situations, involving some notion of recognition or nomination. This might suggest that the possible shared situations are strictly limited to situations of this type. However, it appears that finer distinctions among situations need to be drawn. Thus, sharing does not really seem possible below:

(56) a. ?? John recognized what Mary found, a great talent.
b. ?? John owns what Mary needs, a bicycle.

Again, there is a second reading of these examples, on which they involve type coercion. On that reading, (56a) is synonymous with (56c):

(56) c. I own white horses, and Mary found white horses.

Given these observations, we can generalize that the cases in which sharing of the objects of intensional transitive verbs is possible, without coercion, are those in which the two verbs would not only share the same indefinite NP, but either possible (or actual) satisfaction situations or else a type of satisfaction situation.

What do special quantifiers with transitive intensional verbs then actually range over? It would be inadequate to take special quantifiers themselves to range over sets of satisfaction situations or types of them. One reason is that two intensional verbs sharing their object always interest themselves in the same entity in a satisfaction situation and not others. Thus, they cannot share entire situations themselves. For example, if John needs what Mary needs, namely the solution to a problem, then the satisfaction situations for John's and Mary's needs have to contain both solutions and problems. But what satisfies both John's need and Mary's need is having a solution, not having a

problem. Second, the modifiers that special quantifiers may take always act as predicates of individuals (satisfaction objects) and not satisfaction situations. The example below is an illustration of the point:

(57) John wants something luxurious, namely a Bentley.

Thus, the entities that special quantifiers with intensional transitive verbs range over are object-like, not situation-like. They are what I call *variable satisfiers,* variable objects whose manifestation in a given satisfaction situation is an object that has certain properties in that situation, properties that would be partially specified by a complement of the verb. Two intensional verbs share their object just in case they share a variable satisfier.

A variable satisfier may depend on a particular product or on a kind of product. The first case illustrated by (47b) is repeated below:

(47) b. John promised Mary what she really needed, a car.

Here, a satisfaction situation of John's promise (of a car) is a satisfaction situation of Mary's need (of a car). In any such satisfaction situation, there is a car that Mary has (possibly as a result of John having given it to her). The shared variable satisfier here depends on both John's promise and Mary's need. The variable satisfier is the variable object that in any satisfaction situation *s* has as its manifestation a car that Mary has.

A variable satisfier that depends on a kind of product is illustrated by (48a), repeated below:

(48) a. John (himself) lacks what Mary needs, a car.

What John and Mary share according to (48a) is a variable satisfier that depends on both "the lack of a car" and "the need for a car," two product kinds. This variable satisfier has a manifestation in any situation *s* satisfying an instance of one or the other product kinds, namely a manifestation that is a car that some agent has in *s*.

4. A semantic analysis of intensional transitive verbs with special quantifiers

The semantics of intensional transitive verbs based on the notion of a variable object can now be developed more formally. For that purpose, let us first focus on entities like "John's need of a horse." Just as an attitudinal object such as "John's thought that S" is the (non-enduring) product of an act of thinking, "John's need of a horse" is the (non-enduring) product of a state of needing. The action–product distinction applies with intensional transitive verbs in just the same way as it applies with clausal complement-taking verbs. Both attitudinal objects and objects like "John's need for a horse" have satisfaction conditions.

There is one major difference, though, between attitudinal objects and the products associated with intensional transitive verbs. It concerns the role of the syntactic

complement. With intensional transitive verbs, the complement does not generally specify a propositional constituent, but rather gives a partial characterization of a satisfaction situation of the product of the event or state described. I will assume that the complement of an intensional transitive verb has as its only semantic function that of characterizing the satisfaction situations of the products of the event argument of the verb.[14] Intensional transitive verbs may then simply be taken to express a two-place relation between events and agents.

Let me call a *pure verb of absence* a verb of absence on a use on which it does not also have an interpretation as an epistemic verb or a verb of nomination. Then a pure verb of absence together with its complements has as its denotation the sort of property given below, where $\models$ is the relation that holds between a situation and a product that the situation exactly verifies and 'H' symbolizes the 'have'-relation:[15]

(58) The interpretation of pure verbs of absence
For a pure verb of absence V, a quantificational determiner Q, and a nominal N',
$[V\ Q\ N'] = \lambda i\ \lambda d\ [\exists e(V_i(e, d)\ \&\ \forall s(s \models prod(e) \rightarrow Qx(N'_s(x)\ \&\ H_s(d, x))))]$[16]

[14] In the case of psychological verbs of absence, the complement may actually specify a propositional constituent involved in the mental act or state, in addition to giving a partial characterization of the satisfaction situation. Thus, psychological verbs of absence may involve opacity in the way modal verbs of absence like *need* do not. For the example, the inference from (ia) to (ib) is not valid, but it would be with *need* in place of *want*:

(i) a. John wants eyeglasses.
b. John wants spectacles.

[15] Without the use of products with their satisfaction situations, transitive intensional verbs of absence would require an analysis parallel to Hintikka's analysis of doxastic and epistemic verbs, as modal operators ranging over accessible worlds:

(i) x *needs* Q N' is true in w_o iff for every world w, $w_o\ R_{need,\ j}\ w$, for some property $P \in [Q\ N']$, $\{y \mid \langle x, y\rangle \in H(w)\} = P(w)$.

The accessibility relation $R_{need,\ j}$ relates worlds in which the agent j's needs are satisfied to the world considered actual. However, to give justice to the interpretation of quantificational complements, possible worlds would have to be replaced by situations (Moltmann 2008).

Richard (2001) takes a different approach to account for downward monotone quantifiers, adding a subset to a given accessible world, a subset that will contain the entities the agent "has" when his needs are satisfied.

[16] This account is still not entirely satisfactory. One reason is the "conjunctive force" of disjunctive complements, discussed by Forbes (2006), as below:

(i) John needs a sweater or a jacket.

On the relevant reading, (i) says that John's needs can be satisfied by both a sweater and a jacket. This does not come out from the analysis in (58); since on that analysis (i) is not a valid conclusion from (ii):

(ii) John needs a sweater.

It appears that the disjunctive complement in (i) must provide more than a necessary condition on the satisfaction situations. In some way, it must also provide a sufficient condition to yield the conjunctive force. At the same time, though, the disjunctive NP as such does not generally provide necessary and sufficient conditions on satisfaction situations. If John needs a sweater or a jacket, then it may be that his need is satisfied only if he has a warm sweater or a warm jacket. That is, the obvious solution to the problem of disjunctive complements is in conflict with the account of upward monotonicity (Section 2) that (58) provides. A proper discussion of disjunctive complements of intensional transitive verbs will have to await another occasion.

Here *prod* is the function mapping an event or state to its product.

(58) has a further advantage in that it accounts for two different readings that (7a), repeated below, may display:

(7) a. John needs at most two assistants.

On one reading, let me call it the *exact-match reading*, John's needs are satisfied just in case John has at most two assistants, be it zero, one, or two. On the second reading, there is a particular number *n* of assistants, be it zero, one, or two, and John needs to have *n* assistants. Let me call this the *partial-characterization reading*. On the exact-match reading, *at most two assistants* represents the exact need (at least as regards to how many assistants of a particular sort, if any, are needed). On the partial-characterization reading, *at most two assistants* gives only a partial characterization of the exact need. The analysis in (58) as such captures both readings.

Special quantifiers with intensional transitive verbs, we have seen, do not generally stand for the entity that the corresponding nominalizations refer to, that is, the products of the event or state described. Rather they stand for objects derived from such products, namely variable satisfiers. Variable satisfiers serve the satisfaction of a particular product or else the satisfaction of a kind of product. In the former case, the variable satisfier depends on the particular product of the event argument of the verb. In the latter case, it depends on the kind of product one of whose instances is the product of the event argument of the verb. For example, "the need of a horse" is the kind of intentional object any of whose instances *e* is such that for some agent *d*, *e* = *d*'s need of a horse. As a kind term, *the need for a horse* is to be understood in the way discussed in Chapter 1, namely as a term plurally referring to the various possible instances (just like the terms for a kind of attitudinal object *the thought that* S).

A variable satisfier depends not only on a product or a kind of product. A variable satisfier can be obtained from the product or a kind of product only together with the restriction provided by the complement of the verb. Thus, in the case of *John needs a horse*, the variable object will depend both on "John's need" and the concept expressed by *horse*.

Variable satisfiers dependent on the products described by verbs of absence can then be characterized as follows, where again $\models$ is the relation that holds between a situation and a product just in case the situation exactly satisfies the product, and ag(*e*) is the agent of *e*:

(59) a. The variable satisfier of a product described by a verb of absence
For a product e and a concept C, $\text{var-sat}_{\text{abs}}(e, C)$ = the variable object o such that for any situation s, $s \models e$, $\text{manif}(o, s) = \iota x[C_s(x) \,\&\, \text{HAVE}_s(\text{ag}(e), x)]$; undefined otherwise.

Here I assume that *need* involves the general relation HAVE expressed by *have*. In (59a), "ag(*e*)" stands for the "agent" or "subject" of *e*.

A variable satisfier based on a kind of product, such as "the need for a horse," is a variable object that has manifestations in any situation satisfying an instance of the kind. Thus, for verbs of absence we have:

(59) b. The variable satisfier of a kind of product described by a verb of absence
For a kind of product e and a concept C, var-sat$_{abs\text{-}kind}$(e', C) = the variable object o such that for any product e', e' I e, and any situation s, s $\models$ e', manif(o, s) = ιx[C$_s$(x) &HAVE$_s$(ag(e'), x)]; undefined otherwise.

Here I is the instantiation relation that holds between a particular and a kind (which itself may be understood as the relation "is among" that holds between an individual and a plurality, if kinds are conceived as pluralities).

Variable satisfiers do not depend for their identity on the products described by intensional verbs. Rather, occurrences of different intensional transitive verbs may easily share a variable satisfier. Moreover, variable satisfiers based on kinds of products are independent of any particular agent and thus can be the shared object of occurrences of intensional transitive verbs involving different agents.

Variable satisfiers are associated with a partial function mapping situations to entities that are satisfiers in those situations. They are associated with a partial function because many situations may not contain a satisfier. Using situations allows a single world to contain several satisfiers, namely in different situations.

Variable satisfiers may also involve pluralities as manifestations. This is the case with plural complements in sentences of the following sort:

(60) John needs something, namely two assistants.

In (60), *something* would range over variable satisfiers whose manifestations consist in pluralities of two assistants that John has in the relevant satisfaction situation. For such cases, the definite descriptions used in (59a, b) should be replaced by plural descriptions.

Pluralities as manifestations of variable satisfiers are also needed for quantificational NPs like *at most two assistants* in (7a), repeated again below:

(7) a. John needs at most two assistants.

On the exact-match reading, the variable satisfier has manifestations as pluralities of one or two assistants. On the partial-characterization reading, it has manifestations as pluralities of *n* assistants for some number *n* equal to or less than two.

Let us turn to the formal semantic analysis of special quantifiers with intensional transitive verbs. The analysis will be parallel to the analysis of special quantifiers with attitude verbs. That is, a special quantifier like *something* will have a scope as well as a nominalization domain, as in (61b) for (61a):

(61) a. John needs something.
b. something$_j$ John [$_{jk}$ needs t$_k$]

The nominalization domain can receive two different interpretations, involving either satisfiers based on a particular product of the described event or state or satisfiers based on a kind of product:

(62) a. $[_{ik}\ V\ t_k] = \lambda i\ \lambda x\ \lambda d\ [\exists e \exists C(V_i(e, x)\ \&\ d = \text{var-obj}_{abs}(\text{prod}(e), C))]$
b. $[_{ik}\ V\ t_k] = \lambda i\ \lambda x\ \lambda d\ [\exists e \exists C(V_i(e, d)\ \&\ d = \text{var-obj}_{abs\text{-}kind}(\text{prod}_{kind}(e), C))]$

Here prod_{kind} is the function that maps a particular event *e* to the product kind *k* such that a product *e'* is an instance of *k* just in case it is the product of an instance of the kind to which *e* belongs.

Let us apply this account to some cases. In the following example, the shared object can be a satisfier of particular products:

(63) John needs what he lacks.

In (63), the shared object is a variable satisfier both relative to John's need and a concept *C* and relative to John's lack and the concept *C*.

In the sentences below, the shared object will be a satisfier that depends on a kind of product:

(64) a. John needs what Mary needs.
b. John found what he needed.
c. John found what Mary needed.
d. John has what Mary needs.
e. John gave Mary what she needed.

In (64a), the variable satisfier of both John's need and Mary's need depends on a common kind of product that is a need. In (64b), the satisfier that is shared will be defined for the situation resulting from John's finding, which is in fact also a satisfaction situation for John's need. However, a variable satisfier for John's need will be defined for all the possible situations satisfying John's need, not all of which will be situations resulting from John's finding. Only the type of product of a finding would be able to share a variable satisfier with a product of a need. Also in (64c–e) the variable satisfier will have to depend on kinds of products.

We still have not accounted for the possibility that a variable satisfier may depend on the product of the state resulting from the event described by the verb rather than the product of the described event itself. This requires greater flexibility in the interpretation of the nominalization domain. Thus, (62a) should be replaced by (62c), where r_c is a suitable function determined by the context *c* mapping an event to a closely related one:

(62) c. $[_{jk}\ V\ t_k] = \lambda i\ \lambda x\ \lambda d\ [\exists e \exists C(V_i(e, x)\ \&\ d = \text{var-obj}_{abs}(\text{prod}(r_c(e)), C))]$

Let us then turn to intensional transitive verbs whose complement plays a predicational role in situations of satisfaction, namely verbs of nomination and epistemic verbs. As we

have seen, such verbs involve satisfaction situations in which the complement of the verb will specify a property to be predicated of some object in a situation of satisfaction. This leads to two other sorts of variable satisfiers.

Nominational verbs will involve variable satisfiers of particular products and of kinds of products of the following sort:

(65) a. The variable satisfier of the product described by a verb of nomination
For a product e and a concept C, var-obj$_{nom}$(e, C) = the variable object o such that for any situation s, s $\models$ e, manif(o, s) = ιx[MAKE$_s$(ag(e), x, C)]; undefined otherwise.

b. The variable satisfier of the kind of product described by a verb of nomination
For a kind of product e and a concept C, var-sat$_{nom\text{-}kind}$(e, C) = the variable object o such that for any product e', e' I e, and any situation s, s $\models$ e', manif(s, o) = ιx[MAKE$_s$(ag(e'), x, C)]; undefined otherwise.

Similarly, for epistemic verbs the variable satisfiers depending on a particular product and on a kind of product will be as follows:

(66) a. The variable satisfier of the product described by an epistemic verb
For a product e and a concept C, var-obj$_{epist}$(e, C) = the variable object o such that for any situation s, s $\models$ e, manif(o, s) = ιx[RECOGNIZE$_s$(ag(e), x, C)]

b. The variable satisfier of the kind of product described by an epistemic verb
For a kind of product e and a concept C, var-sat$_{epist\text{-}kind}$(e, C) = the variable object o such that for any product e', e' I e, and any situation s, s $\models$ e', manif(s, o) = ιx[RECOGNIZE$_s$(ag(e'), x, C)]; undefined otherwise.

Thus, depending on the kind of verb in question, there will be three distinct functions mapping a product of the described event onto a variable satisfier, as well as corresponding functions applying to kinds of products. This means that at least six different interpretations of the nominalization domain of a special quantifier with an intensional transitive verb need to be distinguished. In addition to (62c), we will have (62d) and (62e) for the interpretation involving particular products (not kinds):

(62) d. $[_{jk}\ V\ t_k] = \lambda i\ \lambda x\ \lambda d\ [\exists e \exists C(V_i(e, x)\ \&\ d = \text{var-obj}_{nom}(\text{prod}(r_c(e)), C))]$
e. $[_{jk}\ V\ t_k] = \lambda i\ \lambda x\ \lambda d\ [\exists e \exists C(V_i(e, x)\ \&\ d = \text{var-obj}_{epist}(\text{prod}(r_c(e)), C))]$

The logical form of (63a) will then be as in (63b); the one of (64a) as in (64b), and the one of (65a) as in (65b):

(63) a. John needs something nice.
b. $\exists d\ \exists e\ \exists C(V_i(e, \text{John})\ \&\ d = \text{var-obj}_{abs}(\text{prod}(r_c(e)), C)\ \&\ \text{nice}(d))$

(64) a. John promised Mary something that she needed.
b. $\exists d\ \exists e\ \exists C(\text{promise}(e, \text{John})\ \&\ d = \text{var-obj}_{\text{abs}}(\text{prod}_{\text{kind}}(r_c(e)), C)\ \&\ \exists e'\exists C'(\text{need}(e', \text{Mary})\ \&\ d = \text{var-obj}_{\text{abs}}(\text{prod}_{\text{kind}}(r_c(e')), C')))]$

(65) a. John lacks something that Mary needs.
b. $\exists d\ \exists e\ \exists C(\text{lack}(e, \text{John})\ \&\ d = \text{var-obj}_{\text{abs-kind}}(\text{prod}_{\text{kind}}(r_c(e)), C)\ \&\ \exists e'\exists C'(\text{need}(e', \text{Mary})\ \&\ d = \text{var-obj}_{\text{abs-kind}}(\text{prod}_{\text{kind}}(r_c(e')), C')))]$

In (64a) and (65a), *something* has a nominalizing function both with respect to the main verb and with respect to the embedded verb. By contrast, in (63a), it has a nominalizing function with respect to the main verb only; the relative clause here acts as an ordinary restriction on the special quantifier.

Formulating an explicit compositional analysis of intensional transitive verb constructions with special quantifiers within these lines is rather straightforward, and thus need not be elaborated.

5. Explicit reference to variable satisfiers

It appears that variable satisfiers also act as referents of certain definite NPs. These are definite NPs with relative clauses containing an intensional verb as predicate, as in the following sentences with intensional transitive verbs of absence and of possession:

(67) a. The house John needs must be huge.
b. The bottle of wine John bought on the internet was very expensive.

Definite intensional NPs, as one may call the construction, may also involve predicational intensional transitive verbs, such as epistemic *look for* and nominational *need* in the sentences below:

(68) a. The great talent John is looking for will be able to do the task with ease.
b. The assistant John needs has to be fluent in French.

Characteristically, definite intensional NPs with verbs of absence generally require a modal in the main clause. This is illustrated by the unacceptability of the following sentences:[17]

[17] There is a similar construction to the one in (67a, b), but which needs to be sharply distinguished from it:

(i) a. What John needs is a huge castle.
b. The thing John needs is a huge castle.

Two features distinguish sentences like (ia, b) from those involving reference to variable satisfiers. First, in sentences like (ia, b), the expression in post-copular position must be an NP. Thus, (ia) is unacceptable on the same intensional reading:

(ii) ??? What John needs is huge. (Meaning "what John needs is a huge castle.")

Second, sentences like (ia) and (ib) not only fail to require a modal in the main clause, but would be bad with a modal:

(iii) a. ?? What John needs must be a huge castle.
b. ?? The thing John needs must be a huge castle.

(69) a. ?? The book John needs is about Churchill.
b. ?? The castle John is looking for is huge.
c. ?? The great talent John is looking for can perform the task without problem.

The notion of a variable object gives a straightforward semantic account of definite intensional NPs. On that account, discussed in more detail in Moltmann (2012), *the house John needs* in (67a) stands for the variable object *o* whose manifestation in any situation satisfying John's need is a house John has in that situation. The predicate *must be huge* is then true of the variable object *o* in case *huge* is true of the manifestation of *o* in any situation *s* that satisfies John's need. That is, the sentence says that in any situation *s* that satisfies John's need, the manifestation of "the house John needs" in *s*, that is, the house John has in *s*, is huge in *s*.

Definite intensional NPs also allow for certain predicates without a modal, namely predicates such as *count, enumerate*, and *describe*:

(70) a. John counted the papers he promised.
b. John enumerated the things he bought on the internet.
c. John described the assistants he needs.

Such predicates apply to variable objects directly, rather than to their manifestations in particular circumstances, as predicates with a modal would.

At first sight, the construction of intensional definite NPs looks as if it involves reference to the very same variable satisfiers that are the semantic values of special quantifiers and pronouns with intensional transitive verbs. However, there are two major differences.

First, definite intensional NPs are not restricted to intensional transitive verbs, but are equally available with intensional verbs that take clausal complements:

(71) a. The book John needs to write must have a lot of impact.
b. The assistant John wants to hire must be fluent in French.
c. The paper John must write has to be 20 pages long.

The sentences in (i) are of an entirely different type: they are specificational sentences (Higgins 1973), just like the sentences below:

(iv) a. What John does not want is walk home.
b. The thing John does not want is walk home.

In these sentences, special NPs play the particular role of the subjects of specificational sentences (Higgins 1973, Sharvit 1999). Specificational sentences, it is commonly agreed, do not express predication nor in fact identity among individuals. Instead, they express either a question–answer relationship or an identity among intensional objects (meanings) (Chapter 2, Section 3.1). Whatever their correct general analysis, it is clear that in specificational sentences the subject asks for (or provides a way of identifying) the variable satisfier, and the post-copular NP has the function of partially describing that satisfier.

Furthermore, definite intensional NPs cannot denote the shared object of intensional verbs involving different agents:

(72) a. ?? Mary needs the assistant that John needs.
b. ?? Mary wants the castle John is looking for.

The only reading that (72a) and (72b) allow is one on which the definite NP specifies a type of object ("type of assistant," "type of castle"), rather than a particular variable object.

However, intensional definite NPs can act as complements of intensional transitive verbs involving the same agent:

(73) a. John really needs the assistant he is looking for.
b. John found the assistant he needed.
c. John found the great talent he was looking for.

The difference in the semantic interpretation of special NPs with intensional transitive verbs and the semantic interpretation of intensional definite NPs must reside in that the latter involve variable satisfiers dependent on the product of the described event as a particular, whereas the former may involve variable satisfiers that depend on a kind of product. This difference will have to be traced to the semantics of special quantifiers and pronouns with intensional transitive verbs as opposed to the semantics of definite intensional NPs with intensional verbs of whatever sort.

The compositional semantics of definite intensional NPs is not straightforward, and a formal compositional analysis needs to be left for another occasion. Below is simply an indication of the overall interpretation of a definite intensional NP:

(74) [*the e John needs to write e book*] = the variable object o such that for some e, need(e, John), for any situation s, s $\models$ prod(e): manif(o, s) = ιx[book$_s$(x) & write$_s$(x, John)]

That is, *the book John needs to write* stands for a variable object that is dependent on the product of the event argument of the embedding verb *need*, which is what the interpretation of the relative clause itself will have to depend on.

6. Other intensional transitive verbs

We have seen that among intensional transitive verbs, verbs of absence and of possession, epistemic verbs, and verbs of nomination all involve as a central part of their semantics particular sorts of situations, which play the role of satisfaction or realization situations. On these situations the variable satisfiers are based that special quantifiers range over when acting as complements of the intensional transitive verbs discussed so far. There are two classes of intensional transitive verbs that do not seem to involve situations in that way, namely verbs of representation and perception verbs.

6.1. Verbs of representation

Examples of verbs of representation are *draw, paint, represent*, and *imagine*. The complement of a verb of representation may or may not represent an actual object. However, two verbs of representation may share their objects whether or not their complement would represent an actual object. On either reading, whether John meant to represent a particular woman or not, the inference below is valid:

(75) John painted a beautiful woman.
Bill painted a beautiful woman.
John painted the same thing as Bill.

However, clearly, on the non-representational use, no situations of realization or accurateness are involved. Nonetheless, verbs of representation behave like intensional transitive verbs with respect to the interpretation of quantified complements and the possibility of forming definite intensional NPs:

(76) a. John painted at least three trees. (In fact, he painted four.)
b. The woman he painted looks sad.

Two verbs of representation may under suitable circumstances share their object, namely if the two representations produced are of the same type:

(77) a. John painted what he had imagined, namely a beautiful castle.

This also holds if the two agents are distinct:

(77) b. John and Mary imagined the same thing, a trip to China.

What is said to be shared according to (77a) and (77b) is the type of object that the imagination or painting purports to represent.

This raises the question whether and how the account developed so far can be carried over to special quantifiers with verbs of representation. Situations have played a central role in the semantics of intensional transitive verbs so far discussed. However, this is not the case for verbs of representation. Clearly, verbs of representation describe either an act meant to represent an actual object or an act that pretends to do so. However, verbs of representation are directed toward an object (as described by the complement), not a situation (involving a relation to an object described by the complement). This is confirmed by intuitions about when sharing is not possible. Verbs of representation cannot share their object with a verb of absence, an epistemic verb, or a verb of ownership:

(78) a. ??? John painted what Mary needs/recognized/owns/described, namely a castle.
b. ??? John imagines the thing that Mary needs/recognized/owns/described, namely a castle.

(Though, of course, there is one reading where these examples are acceptable, involving type-coercion.)

The objects of representational intensional transitive verbs thus appear to be representations or kinds of them. An ordinary NP complement has the function of partially characterizing such representations. Object representations themselves may be enduring entities in the case of acts of painting or drawing or non-enduring entities in the case of imagining. The object of a verb of representation will thus be the product of the event or state described by the representational verb or else the kind of product obtained from the kind of event or state described.

Intensional definite NPs with a verb of depiction such as *the women John painted* will refer to a particular representational object, not a type.

6.2. Perception verbs

Another class of intensional transitive verbs is perception verbs like *see*. An intensional reading of *see* is what makes the following sentence acceptable:

(79) John saw a ghost.

The NP complements of perception verbs on the intensional reading do not describe the external object that may be perceived, but rather the way the perceived object appears (allowing for perceptual illusion) or perhaps describes a mere appearance (in the case of perceptual hallucination).

The Relational Analysis of transitive intensional perception verbs might posit sense data as the arguments of perception verbs, so that the complement would have the role of characterizing sense data.[18] However, sense data are philosophically highly controversial.[19] Without going into detail, the problems concern first the perceptual relation itself, which, it is generally argued, relates the agent directly to the world, rather than being mediated by another objectual level of sense data. Second, they concern the status of sense data as objects. In a number of ways, sense data do not behave like ordinary objects with respect to the properties they may be attributed (sense data may be underdetermined and underspecified with respect to properties normally attributable to objects, and they may have contradictory properties).[20]

[18] This is the view of a number of philosophers notably Ayer. Austin (1962) denies that *see* has a proper intensional use on which its complement may describe an object that does not exist. For the notion of a sense-datum, see Moore (1953), Chapter 2.

[19] See in particular Austin (1962) for a critique.

[20] There is also the view that the complement of perception verbs acts semantically like an adverbial, modifying the event of perception. This is the so-called *Adverbial Theory* of perception (Chisholm 1957, Tye 1984, 1989, Audi 1998). The Adverbial Theory denies that appearances act as intermediary objects between perceiver and object perceived. Instead, it takes complements as apparently specifying appearances to form part of a complex predicate together with the perception verb. Thus, in *the chair looks green, looks green* would act as a complex predicate, as would *see a ghost* in (79). Sometimes, as the name suggests, such complements are taken to act like adverbials, qualifying the experience (rather than being descriptions of sense data) (cf. Tye 1984, 1989, Audi 1998). That is, (79) would be analyzed as something like "John saw ghostly." Linguistically, this seems rather problematic. Adverbials like *yesterday* and *quickly* generally can be taken to express properties

The complement *a ghost* in (79) rather seems to play the role of a predicate in some predicative act involved in the perceptual experience itself. Without elaborating such a non-relational analysis, let us just say that given such an analysis of intensional perception verb constructions, the complements will play a predicative role, rather than the role of providing an argument (a sense datum) for a perceptual relation.

A notion somewhat related to that of a sense datum does play a role in the semantics of intensional perception verbs, though. In particular, special quantifiers as complements of perception verbs seem to range over entities related to sense data. Thus, the sorts of restrictions that special quantifiers with perception verbs allow appear to match the two sorts of properties that sense data are supposed to have:

[1] Sense data share properties of the object they purport to represent (expressed by predicative complements of verbs of appearance)—as long as these properties are sensory and non-sortal.
[2] Sense data have their own causal and temporal properties.

The contrast below indicates that special quantifiers with transitive perception verbs allow for restrictions expressing sensory properties, but not sortal properties if there is no actual object perceived:

(80) a. John saw something yellow and round.
b. ?? John saw something that was a yellow ball.

(80a) may of course also describe a case of perceptual illusion or hallucination.

Moreover, special quantifiers with verbs of perception accept restrictions expressing causal properties:

(81) John saw something that disturbed him (namely a ghost).

However, the reason why the semantic values of special quantifiers with perception verbs allow for such predicates may be a different one than that they would range over sense data. Given the unmodified Nominalization Theory, special quantifiers with transitive intensional perception verbs should range over products of acts of perception. Nominalizations describing products of acts of perception appear in the sentences below:

(82) a. John had a sensation.
b. Mary gave the impression of a young girl.

Given the unmodified Nominalization Theory, those entities would also be the semantic values of special quantifiers when acting as complements of intensional transitive verbs of

of events (as on a Davidsonian view), whereas it is quite unclear how *green* in *the chair looks green* or *a ghost* in *John saw a ghost* could be viewed as a property of events. It is certainly not the perception that is green or ghostlike.

perception. Recall from Section 3.1 that products of intensional transitive verbs like *need* and *buy* may be individuated in part on the basis of possible satisfiers (for example for the purpose of counting). This may also hold in the present case: the product of an act of perception may carry certain properties attributed in the perceptual act, in particular sensory properties. In fact, the philosophical literature on perception itself frequently makes use of NPs like *a blue sensation* or *a blue impression*. The philosophical literature generally uses the noun *sensation* as a general term for sense data. *Sensation* is in fact a product nominalization describing the products of acts of perception.[21] As products of acts of perception, sensations may be able to carry properties attributed to what would be satisfiers of such acts. Note, however, that not all product nominalization of perception verbs accepts modifiers representing what is perceived (*a blue perception* is rather bad).

Additional evidence in favor of the Nominalization Theory of special quantifiers with perception verbs comes from the observation that special quantifiers may stand for objects shared by different occurrences of perception verbs with different agents:

(83) a. John saw the same thing as Mary, namely a ghost.
b. John and Mary had the same visual illusion of a ghost.

Given the Nominalization Theory, this means that with perception verbs, special quantifiers, as always, may range over kinds of products rather than ranging over particular products. Sense data, by contrast, would not be things shareable that way.

It seems then that the notion of a product of an act of perception gives some justice to intuitions in favor of sense data. However, unlike sense data, perceptual products as the semantic values of nominalizations and nominalizing (special) quantifiers would not play a direct role in perceptual relations. Rather, they are introduced by nominalizing expressions as derivative entities, as the products not the objects of perceptual acts.

It is not clear, however, that special quantifiers with perception verbs really do range over products. There is one serious difficulty for the view that they do. One major difference between the notion of a sense datum and the notion of the product of an act of perception is that the product of an act of perception should have satisfaction conditions, such as conditions of perceptual accurateness, whereas this does not hold for sense data as they are commonly understood. Certainly, predicates of correctness are applicable to product nominalizations (*a correct impression, a correct perception*). However, they do not make much sense with special quantifiers as complements of perception verbs, on the relevant reading. Thus, (84b) is hardly possible as a continuation of (84a):

[21] Moore considered the noun *sensation* ambiguous between describing events of perception and describing sense data and therefore rejected it as a term for sense data. Moore (1953) himself took sense data to be independent of acts of perception. For Moore, they seem to be tropes perceivable by an agent.

On the present view, the noun *sensation* is unambiguous. It always describes the "products" of acts of perception, that is, mind-dependent entities (or kinds of them) with representational properties.

(84) a. In the distance, John saw a woman with blond hair.
b. ?? John saw something correct.

Thus, we must conclude that the unmodified Nominalization Theory does not straightforwardly apply to special quantifiers with perception verbs.

7. Conclusion

This chapter has explored the application of the Nominalization Theory to special quantifiers when they are complements of intensional transitive verbs. We have seen that it applies with most of the intensional transitive verbs, though some modifications of the theory were needed. With intensional transitive verbs of absence and of nomination and with epistemic intensional transitive verbs, special quantifiers do not range over the sorts of things that the corresponding nominalizations could refer to, but rather over more derivative entities, namely variable satisfiers. The latter are entities that depend on the product of the event or state described by an intensional transitive verb (or the corresponding kind). This was not a problem for the Nominalization Theory as such, but simply required a modification of that theory to allow special quantifiers to range over variable satisfiers. Variable satisfiers, we have seen, play another semantic role independently of special quantifiers, namely as the semantic values of certain types of definite NPs with intensional relative clauses.

The distinction between actions and products holds for intensional transitive verbs in the same way as it did for clausal-complement-taking attitude verbs. However, the complement of intensional transitive verbs plays quite a different role in the characterization of such products from the clausal complement of an attitude verb. The complement of an intensional transitive verb in general characterizes satisfaction situations of the product of the event or state described. It does not serve to specify the propositional constituents of the content of a propositional attitude.

The products associated with intensional transitive verbs are otherwise just like the products of propositional attitudes. They are concrete objects that may be causally efficacious, yet they are not events or states. Unlike events or states, they have representational properties, in particular satisfaction conditions or similar conditions of verification or realization.

6

Reifying Terms

Natural languages display various sorts of referential noun phrases that serve to introduce an entity on the basis of a non-referential expression. One such noun phrase was discussed in Chapter 1, namely *explicit property-referring terms*, noun phrases introducing a property either as in (1a) on the basis of a predicate (*wise*), or on the basis of an expression plurally referring to tropes (*wisdom*), as in (1b):

(1) a. the property of being wise
b. the property of wisdom

Other noun phrases that introduce entities on the basis of non-referential expressions were discussed in Chapter 2, namely *explicit fact-referring terms*, as in (1c), and *explicit state-referring terms*, as in (1d). Possibility-referring terms as in (1e) were not explicitly discussed, but they belong to the same type:

(1) c. the fact that John is wise
d. the state of John's being wise
e. the possibility that it might rain

Such noun phrases introduce facts and states on the basis of (non-referential) clausal complements (*that*-clauses or gerunds).

NPs that serve to introduce entities on the basis of non-referential expressions are generally definite NPs composed of a sortal noun (*property, fact, state*) followed by a non-referential expression. In Chapters 1 and 2, I sketched an account according to which such NPs introduce objects whose properties can be read off true sentences in which the relevant non-referential expression occurs. That is, NPs of the sort in (1) obtain their referents by reifying, in a certain way, the use or meaning of the non-referential expression that follows the sortal. Thus, they can be called *reifying terms*. Reifying terms do not describe their referents or refer to them directly; rather they introduce them in a way that is reflected in their syntactic structure.

The class of reifying terms includes another important type of NP besides the one exemplified by (1a–d), namely NPs like the following:[1]

[1] Reifying terms of this sort have not received a lot of attention in the linguistic literature. Aside from the article of Jackendoff (1984) (who does not use a particular term for the construction), they have been

(2) a. the name "John"
b. the poet Goethe
c. the fictional character Sherlock Holmes

(3) a. the numeral "four"
b. the number four

(4) the color green

(5) a. the metal gold
b. the kind human being

(6) a. the truth value true
b. the direction north
c. the concept horse

Those NPs, I will argue, all introduce their objects of reference on the basis of a non-referential expression or non-referential occurrence of an expression, the expression following the sortal head noun. In all cases, I will argue, they introduce their object of reference on the basis of the mention rather than the use of the expression following the sortal. In the most interesting cases (2c), (3b), (4), (5), and (6a–c), this introduction consists in the reification of the meaning or use of a non-referential expression, that is, in the introduction of an abstract object on the basis of an expression not referring to an abstract object or any object.

The goal of this chapter is to give a syntactic characterization of reifying terms, to sketch a general semantics for them, and to discuss in some detail particular kinds of reifying terms, namely those involving reference to numbers, colors, and expression types. The chapter will also introduce new criteria for what I call *quasi-referential referential terms*, expressions which can take the position of referential NPs, but which do not in fact have a referential semantic function. They include simple numerals, color adjectives, and *that*-clauses as they occur in reifying terms.

1. The general structure and semantics of reifying terms

The general linguistic structure of reifying terms consists of a definite determiner, followed by a sortal noun, followed by a non-referential or non-referentially used expression. I will call the latter the *denominative complement,* since it serves, in a sense, to

discussed mainly in the French linguistic literature (Kleiber 1984, van de Velde 2001) as "binominal denominative structures."

A term used for the particular case of (2b) is "close apposition." This does not mean, though, that the syntactic relation between the sortal and the following expression is one of apposition (Jackendoff 1984). Kleiber (1984) uses the term "inverted apposition."

The existing literature restricts itself generally to reifying terms expressing an apparent identity of referents, as in (2b), or to categorized mentions, as in (2a). The present focus is on such terms in their reifying function best exemplified by the examples (4), (5), and (6).

name the entity that the reifying term refers to.[2] The reifying terms in (2)–(6) in particular have the following structure:

(7) definite determiner—sortal noun—denominative complement

In (2a), the denominative complement is not used referentially, but rather is quoted. I will argue that even in (2b), the proper name that acts as the denominative complement is not used referentially. This is also the case in (2c), allowing the reifying term to introduce a fictional character as its object of reference based on the pretend use of the name in the story. Similarly, not only in (3a), but also in (3b) the numeral is not used referentially. In fact, simple numerals, I will argue, are non-referential expressions not only when occurring as determiners or noun modifiers, but also when occurring in apparently referential position. In (4), an explicit color-referring term, the denominative complement *green*, can itself function both as an adjective and as a bare noun, but even in the latter case it retains a non-referential status, or so I will argue. The kind-referring term *the kind human being* in (5) was discussed already in Chapter 1, where I argued that a bare mass noun like *human being* is not a referential singular term, but a modalized plural term, referring to the various instances of the kind in the different circumstances. In (6a–c), the denominative complements are adjectives and nouns and thus not referential expressions.

The sortal in reifying terms has a particular semantic role that is different from its standard semantic role as a sortal. In the context of a reifying term, it does not just express a property specifying identity conditions for an object (the standard semantic role of a sortal), but rather it has an object-introducing ("reifying") function. It serves to introduce an object, in one way or another, based on the denominative complement, possibly together with a particular context in which the denominative complement may occur. Different reifying nouns introduce objects in that way differently, which I will come to shortly.

Reifying terms divide into two distinct formal types, which I will call *type 1 reifying terms* and *type 2 reifying terms*. Type 1 reifying terms are those in (1). Type 2 reifying terms are those in (2)–(6). Reifying terms of both types consist of the same components: the definite determiner *the*, a sortal noun, and a non-referential or non-referentially used expression. They also introduce their objects of reference in similar ways. However, they have somewhat different syntactic properties.

The main difference between type 2 reifying terms and type 1 reifying terms concerns the denominative complement. In type 2 reifying terms, the denominative

[2] The term "denominative complement" should not imply that the two terms in the construction stand in an ordinary relation of complementhood. McCawley (1998) points out that the sortal can itself take an ordinary complement:

(i) the former president of the US and one-time Hollywood actor Ronald Reagan

The relation between the sortal head noun and the denominative complement is thus not that of an ordinary complement.

complement is not subject to any conditions whatsoever on its syntactic category or syntactic features. It can be an NP, but also an adjective or a determiner. In fact, it can be of any syntactic, morphological, or phonological category whatsoever. It can even be a mere sound (*the sound pff*). Moreover, it can be an expression from a different language (*the French adjective rouge*) or a mere symbol (*the symbol &*). To unify those various cases, the denominative complement in type 2 reifying terms is best considered mentioned, not used. Contexts of quotation, and only those, do not impose any constraints whatsoever on the sorts of expressions they can accept. If the denominative complement is mentioned rather than used, this means that the denominative complement does not itself act as an expression-referring term, but rather simply "presents itself" with all its linguistic features: its syntactic, morphological, phonological, and phonetic form, as well as its meaning, and possibly referent and context of use. By contrast, in type 1 reifying terms, the denominative complement must be a clause or the complement of a preposition (*of*). Moreover, in type 1 reifying terms, the denominative complement is not mentioned but used with its usual denotation, such as in (1a) a property, in (1b) the plurality of instances of wisdom, and in (1b) and (1c) a proposition, that is, the configuration of propositional constituents given by the embedded sentence (Chapter 4).

While there is a range of rather diverse kinds of reifying terms, they have a common syntactic structure and semantics. In all cases, the function of the sortal is to introduce an object of reference on the basis of the (generally) non-referential denominative complement (and possibly its context of use). The strategies of introducing objects of reference are different, though, for different sortals. Sortals in their reifying function differ in the way they exploit different aspects of the presentation of the denominative complement. They take into account the formal aspects of the denominative complement in the case of expression-referring terms, and its referent in the case of *the poet Goethe*.[3] In the case of *the fictional character Sherlock Holmes*, it is the pretend use of the name in the story; and in the case of *the number four,* it is the non-referential, "adjectival" use of the numeral in arithmetical contexts, given what Dummett calls the "Adjectival Strategy" (Section 5).

The latter two strategies of introducing objects are particularly interesting philosophically. Introducing objects such as fictional characters or numbers on the basis of

[3] The close apposition *the poet Goethe* simply picks up the referent of the mentioned name *Goethe*. As was pointed out to me by O. Matushansky, it differs in that respect from noun phrases like *Goethe the poet* or *Goethe as a poet*. The latter appears to introduce a new object of the sort "Goethe qua being a poet" or "Goethe from the point of view of being a poet" (as opposed to the point of view of being a neighbor or a lover), which would involve another form of reification. Thus, whereas (ia) is perfectly fine, (ib) and (ic) sound peculiar because the predicate has nothing to do with Goethe being a poet:

(i) a. The poet Goethe was a nice man.
b. ? Goethe the poet was a nice man.
c. ? Goethe as a poet was a nice man.

non-referential expressions or uses of expressions means introducing objects that are not subject to empirical investigation, objects whose nature is exhausted by the constitutive conditions that go along with the strategy of introducing them. This raises a range of questions of rather fundamental sorts, questions that generally arise with theories that allow objects to be introduced on the basis of expressions or concepts, such as the theory of pleonastic entities of Schiffer (2003) and Fregean and neo-Fregean approaches to numbers as entities introduced by principles of abstraction from concepts (Wright 1983, Hale 1987).[4]

One question that such theories raise is: what guarantees that the so-introduced objects exist, and in what sense do they exist, given that they are not part of the empirical world? Another question is: how can it be decided if the introduced objects have particular properties that are not fixed by the strategy of introducing them, properties that would not be fixed on the basis of the relevant expressions (or their uses) or concepts?

A third question that the theories raise is whether the introduced objects are to be considered dependent on language, and in particular, the existence and use of a reifying term. Schiffer (1996) has pointed out that the view that the properties of a pleonastic entity can be read off the contexts in which a particular expression occurs non-referentially does not mean that the object-introducing term *creates* the object. In Schiffer's terms, the introduced objects are "language-created," but "language-independent" objects (Schiffer 1996). They would exist even if no one used or created the corresponding object-introducing term, as long as the conditions are satisfied that make the various contexts true in which the non-referential correlate may occur. The use of the object-introducing terms simply enables epistemic access to the objects that depend on those contexts (Schiffer 1996). Thus, fictional characters depend entirely for their existence and identity on the story and its origins. However, this does not mean that fictional characters themselves are "created." Rather, once the story occurring in the story exists in a world, the fictional character occurring in the story exists there as well, whether or not anyone conceived of it or referred to it. Once there is the story, an object that is a fictional character occurring in the story exists as well. This view naturally carries over to the other cases of reifying terms.

A fourth question concerns general constraints on strategies for introducing entities based on non-referential expressions or concepts. One general constraint that has been proposed is conservativity (Schiffer 1996): the introduction of the new entities should lead to a conservative extension of the existing theory, that is, roughly, it should not

[4] The latter approaches are meant to apply to natural language expressions that I do not think introduce objects based on non-referential expressions or concepts. Schiffer (2003) takes *that*-clauses to be referential terms whose referents, "pleonastic propositions," are introduced on the basis of sentences, and he takes properties generally to be introduced by predicates. Frege and neo-Fregeans take numbers to be introduced by concepts, which in turn is taken to be reflected in the linguistic structure of terms like *the number of planets*. My own view is that *that*-clauses do not act as referential terms (Chapter 4) and that *the number of planets* does not refer to a number, but rather to a "number trope" (Chapter 2).

lead to new truths except for statements involving the reifying terms themselves that are in question.

I will not address in greater depth questions like these, which the semantics of reifying terms will raise. The purpose of this chapter is simply to identify a syntactic category of reifying terms as terms whose semantics involves strategies of introducing objects on the basis of non-referentially used expressions occurring in those terms.

Often, the denominative complement of a reifying term has a quasi-referential status. In general, the expressions acting as the denominative complements can occur in syntactic positions in which also referential terms can occur. This holds for quotations, number words, and simple color words, as well as of course bare adjective nominalizations and *that*-clauses. Syntactically, such expressions look like referential terms (and have often been mistaken for referential terms), but semantically they in fact do not have that status, as we will see. Rather they are *quasi-referential terms*. This means also that predicates that can be true with quasi-referential terms do not really express a property of objects, but rather have a syncategorematic status. If the same predicates are true with corresponding reifying terms, this is because the predicates have a secondary, categorematic meaning, a semantic role in which they do express properties of objects. Three "degrees of objecthood" associated with the use of terms thus can be distinguished. The first degree involves the use of quasi-referential terms that do not have objects as referents. The second degree involves the use of reifying terms, which involves the introduction of objects of reference on the basis of linguistic structure. The third degree involves reference to "real" objects not driven by language or concepts.

In what follows, I will first present a further range of syntactic properties of reifying terms and present criteria showing the referential status of reifying terms. Then I will discuss in detail three specific kinds of reifying terms: those introducing expressions, numbers, and colors. Finally, I provide syntactic evidence for the non-referential status of the denominative complement in reifying terms, in particular quotations, numerals, and color words.

2. Linguistic properties of reifying terms

Reifying terms of the two types share a number of syntactic properties, besides containing a sortal head noun and a denominative complement:

[1] Restriction to the pleonastic determiner

Both types of reifying terms require a definite determiner. Moreover, the determiner must be the simple definite determiner *the* and cannot be, for example, a quantifier or the demonstrative *that*:

(8) a. ??? that name 'John'
b. ??? every philosopher Strawson
c. ??? John has never heard a name 'Joelle'.

(9) a. ??? some color green
b. ??? a certain color turquoise

(10) a. ??? the fact that it is raining
b. ??? a fact that someone left
c. ??? a certain fact that someone left

The simple definite determiner *the* in reifying terms is in fact the pleonastic determiner, a simple definite determiner that fails to convey definiteness, but rather occurs in contexts where definiteness is ensured already independently (such as with proper names in those languages that require a determiner with a proper name) (Longobardi 1994).[5]

[2] No restrictive modifiers

Both types of reifying terms resist restrictive modifiers. Thus, the examples below are impossible:

(11) a. ??? the first philosopher Strawson I met
b. ??? the lightest color green
c. ??? the white metal gold
d. ??? the first fact that someone failed the exam

Non-restrictive modifiers, by contrast, are unproblematic (*the popular color red, the beautiful metal gold*); neither are adjectival modifiers that modify the sortal only (*the German name 'Gretchen', the classical composer Haydn*).

[3] Alternation with reifying predicates

Both types of reifying terms alternate with predicative constructions in which the denominative complement acts as the subject and the sortal introduces the predicate (which itself then allows for an indefinite determiner):[6]

(12) a. That S is a fact I was not aware of.
b. That S is a possibility I have not thought of.

(13) a. Wisdom is a property that is admirable.
b. Generosity is a property that is nice.

[5] Type 2 reifying terms may alternatively contain a possessive NP in specifier position:

(i) my brother Bill

I take it that the definiteness that goes along with possessive NPs may be just as redundant as that of a pleonastic determiner. This is supported by the fact that a quantified NP in specifier position could not change the inherent definiteness of the combination sortal-denominative complement:

(ii) ??? every student's mother Mary

(ii) is impossible even in a context in which every one of the relevant students happens to have a mother named "Mary."

[6] This alternation has been observed for type 2 reifying terms referring to expressions by Kleiber (1984).

(14) a. "John" is a name that is given to many boys.
b. Sherlock Holmes is a fictional character that is well known

(15) a. Twelve is a number that interests me a lot.
b. "Twelve" is a numeral that is simpler than "thirteen."

(16) Green is a color that is complementary to red.

As was discussed in relation to predicative and clausal complements, the sortal in this construction has a reifying effect as a predicate, and the subject has a non-referential status. Let me therefore call the complex predicates in (11)–(16) *reifying predicates*.

Type 1 and type 2 reifying expressions differ linguistically in two respects. First, only type 2, not type 1, reifying terms allow for the plural:

(17) a. the names "John" and "Mary"
b. the numbers two and four
c. the colors green and red
d. the metals gold and silver

(18) a. * the propositions that it will rain and that it will snow
b. * the facts that John is wise and that Mary is intelligent

This difference, though, does not hold for reifying predicates:

(19) a. Wisdom and intelligence are properties I appreciate a lot.
b. That it will rain and that it will snow are two facts that I was not aware of.

Second, only in type 2 reifying terms does the denominative complement occur in what looks like an intensional (in fact hyperintensional) context. In type 1 reifying terms, the denominative complement does stand for an intensional entity (a property or a proposition), but it does not occur in an intensional context, a context in which an expression would have a different meaning than it usually does. The denominative complement in type 1 reifying terms has the same intensional entity as its meaning (a proposition or property) as it has anywhere else. By contrast, in type 2 reifying terms, the denominative complement occurs in what looks like an intensional or hyperintensional context. Thus, the denominative complement in type 2 reifying terms does not allow for substitution by a description describing the entity it appears to stand for:

(20) a. ??? Mary's brother Bill's father (John = Bill's father)
b. ??? the name Joe's last name
c. ??? the numeral the word two
d. ??? the number the smallest prime number
e. * the color the complementary color of red
f. * the kind that kind

Expression-referring reifying terms make clear that not only the meaning (and referent) of the denominative complement may matter for specifying the referent, but also its form. Depending on the sortal head noun, the denominative complement may make different sorts of contributions to the fixing of the referent of the entire referential term. In *the poet Goethe*, only the referent of the denominative complement matters. In *the name John* and *the numeral four*, it is its form. In *the kind human being, the color green, the truth value true, the direction north*, and *the concept horse*, it is its meaning. In *the fictional character Sherlock Holmes*, it is its use in a fictional context. These various cases can be unified if the denominative complement is considered as merely mentioned, that is as merely "presenting itself," with its phonological, morphological, and syntactic form and its meaning, and, if applicable, its referent and context of use.[7] The presentation may also include the (pretend) use of the expression in the story, and its inferential role in the relevant (e.g. mathematical) contexts, as well as various linguistic practices involving it. It will be a matter of the reifying strategy, which of these features of the *presentation* of the expression are exploited.

The denominative complement of type 2 reifying terms is rather special in that it may be of any syntactic category whatsoever. In fact, it need not even be a syntactic unit and thus belong to a syntactic category. It may just be a morphological or phonological unit (as in *the morpheme wer, the letter k*), or even just a phonetic unit or a mere sound (*the sound pff*). The denominative complement need not satisfy any syntactic condition whatsoever, such as being case-marked. In fact, the denominative complement enjoys the very same syntactic freedom as any quoted expression.[8]

Since the reifying sortal has the function of mapping the presentation of the denominative complement onto an object, this means that uniqueness of a referent is guaranteed already by the sortal head noun. Therefore, the definite determiner need not make its own semantic contribution, but as a pleonastic determiner is a mere reflection of an independently present semantic contribution of the head noun. It also means that there is simply no role for a restrictive modifier to play.

3. The referentiality of reifying terms

In type 2 reifying terms, the denominative complement merely "presents" an expression with its various features and contexts of use, and the sortal head noun has the function of mapping such a presentation onto an object. The different kinds of reifying terms are associated with different kinds of operations of mapping the presentation of the denominative complement onto an object. Which operation will be at play

[7] For the view that the denominative complement is always mentioned rather than used, see also van de Velde (2001).

[8] The denominative complement, just like quotation in general, poses a challenge to syntactic theory, namely how such elements can be integrated into the syntactic structure of the sentence. As far as I know, no account has as yet been developed.

depends on the sortal that is the head noun of the reifying term. The operation may consist in making the mentioned expression the object of reference (*the name John*), in introducing a number as an object on the basis of the determiner meaning of numerals (*the numeral four*), in introducing a color object on the basis of predicative and attributive uses of color words (*the color green*), in introducing a kind object on the basis of a plurality of possible particulars (*the metal gold*), or in introducing a truth value on the basis of the conceptual meaning/application conditions of "true" (*the truth value true*).

An important question that imposes itself is, are reifying terms really referential terms, referring to objects? There are a number of standard criteria for referential terms, such as their ability to "flank the identity sign," as Frege would put it, or to be replaced by quantifiers (under certain circumstances). However, such standard criteria are not unproblematic in that they are generally also satisfied by quasi-referential terms. There are more convincing criteria for referential terms, namely the applicability of object-related predicates. Unfortunately, though, there does not seem to be a single class of predicates that identify all the reifying terms as referential terms. The reason for that is that some expressions able to act as denominative complement seem to have a referential function in subject position, allowing for the same predicates as the corresponding reifying term.

Let us first look at object-related predicates for reifying terms that stand for facts or properties. One such "predicate" is the verb *exist*. *Exist* is applicable to fact-referring, possibility-referring, and property-referring reifying terms, but not to the corresponding denominative complement, or rather when it is applicable to the latter, as in (22a), it displays a different reading:

(21) a. The fact that it is raining exists.
b. The possibility that it might rain exists.
c. ??? That it is raining exists.

(22) a. The property of wisdom exists.
b. Wisdom exists.

(22a) states the existence of an abstract object, but (22b) means "instances of wisdom exist."

Exist thus distinguishes between explicit fact-referring and property-referring terms on the one hand and *that*-clauses and bare nominalizations (both non-referential expressions) on the other hand. *Exist*, however, can apply to explicit expression-referring terms as well as the simple quotations that would make up their denominative complement:

(23) a. The name "John" exists.
b. "John" exists.

(24) a. The numeral "two" exists.
b. "Two" exists.

This indicates that the subject position is a referential quotational context, allowing for quoted expressions to act as expression-referring terms (Section 4).

Another type of predicate that is indicative of true referential terms is evaluative predicates, such as *nice* or *interesting*. When applied to kinds or properties as objects, such predicates evaluate an abstract entity, but they have an instance-related reading with bare plurals and mass nouns. The examples below illustrate the differences:

(25) a. Human beings are nice.
b. The kind human being is nice.

(26) a. Originality is interesting.
b. The property of being original is interesting.

Unlike in (25a), *nice* in (25b) evaluates a kind as an abstract object, and unlike in (26a), *interesting* in (26b) evaluates a property as an abstract object.

Evaluative predicates are useful, however, only when the denominative complement is a plural term. For example, evaluative predicates are equally applicable to simple quotations and explicit expression-referring terms in subject position (which again is indicative of the subject position being a referential quotational context, as will be discussed in Section 4).

Another type of predicate making the distinction is predicates expressing object-related attitudes. Thus, the predicates below appear to distinguish between referential and non-referential expressions:

(27) a. The possibility that it might rain was the object of John's worry.
b. ?? That it might rain was the object of John's worry.

(28) a. The number twelve was the topic of John's article.
b. ?? Twelve was the topic of John's article.

(29) a. The color green was the subject of his research.
b. ?? Green was the subject of his research.

There may be other kinds of predicates in particular cases indicative of the referentiality of reifying terms. In the case of fictional characters, there is an established distinction between "nuclear" properties (properties predicated within the story of the entity the author pretends to refer to) and "extranuclear" properties (properties the fictional character has as an entity in itself). Reifying terms referring to fictional characters are formally of exactly the same sort as other type 2 reifying terms. Thus, one might take the applicability of predicates expressing extranuclear properties to be indicative of the referential status of the reifying term standing for a fictional character. However, predicates expressing extranuclear properties are applicable not only to the semantic values of reifying terms, but also to those of simple proper names, which thus may themselves be able to refer to fictional characters (*Shakespeare created Hamlet/the fictional character Hamlet*). That is, the denominative complement of such reifying terms

can be used to refer to the very same entity as the reifying term itself. This is not so, for example, for reifying terms referring to numbers, colors, properties, or facts.

After these general considerations regarding reifying terms, let me now turn my attention to three particular cases of reifying terms of type 2.

4. Expression-referring terms and quotation

In expression-referring reifying terms, the denominative complement has the status of a quotation. A nearly standard view about quotation is that it involves the formation from an expression X of a new referential term referring to X (let us say by "silent" quotes). Yet the denominative complement of an expression-referring term could not involve quotation in that sense. In fact, there are several types of quotation that could not involve the formation of an expression-referring term. If quotation amounts to the formation of an expression-referring term, then a quoted expression "X" and the term *the expression* X should be interchangeable without change in the meaning of the relevant sentence as a whole. However, in most contexts "X" and *the expression* X are in fact not interchangeable.

At least three contexts of quotation should be distinguished: *referential, predicative*, and what I will call *presentational contexts*. Only referential quotational contexts involve an expression-referring use of quotation and thus allow the quoted expression to be substituted by an explicit expression-referring term. The subject position in general is a referential quotational context:

(30) a. "Joe" has three letters.
a'. The name 'Joe' has three letters.
b. "Walk slowly" consists of two words.
b'. The expression "walk slowly" consists of two words.

Predicative quotational contexts are those of the complement position of verbs of calling. They involve the attribution of a name to an individual. As illustrated below, they do not permit the substitution of the complement by an explicit expression-referring term:[9, 10]

[9] Matushansky (2008) argued that names in naming constructions as in (31, 32) generally have the status of predicative NPs, rather than referential NPs. In general, they show the syntactic behavior of predicates and in fact, in many languages, they display predicative marking. This means that NPs in a quotational role in contexts such as (31, 32) do not involve quotation in the sense of an operation forming an expression-referring term; rather the expression will figure in a predicative meaning, whatever that may consist in (see Matushansky 2008 for a proposal).

[10] There are also contexts in which an explicit expression-referring term can appear, but not a simple quotation:

(i) a. They gave him the name "John."
b. ??? They gave him "John."

(31) a. They called him "John."
b. ??? They called him the name "John."

(32) a. He was baptized "John."
b. ??? He was baptized the name "John."

Presentational quotational contexts include those of the complement position of verbs of utterance as well as meaning. Some verbs of utterance do not easily allow for a replacement of the complement by an explicit expression-referring term, for example *say*, or *scream*:

(33) a. John said "I will come"/? the sentence "I will come."
b. John screamed "yes"/? the expression "yes."

Others, though, do:

(33) c. John cannot repeat spell/pronounce/write down "Gretchen"/the name "Gretchen."

Such verbs set up a referential quotational context.

Also the verb *mean* does not allow for a replacement of its complement by an explicit description of an expression or a "meaning":[11]

(34) a. The French adjective "rouge" means "red."
b. ??? "Rouge" means the expression "red"/the meaning of "red."

As (30) and (33c) make clear, the referential quotational role is itself dependent on a syntactic context: it requires a particular kind of predicate if the expression is in object position or else it requires the expression to be in subject position. This means that there is no operation of quotation as such for forming expression-referring terms. There are only *quotational roles* for expressions, licensed by the syntactic and lexical environment in which the expression occurs. One such role is that of acting as an expression-referring term; another role is that of acting predicatively in an act of calling; yet a third role is that of simply presenting itself, with its form and content and perhaps pronunciation. This is what happens in the complement position of *say, scream*, and *mean*, but also in the position of the denominative complement of a reifying term.

There is one approach to quotation that is particularly suited for those contexts of quotation, namely an approach according to which quotation amounts to an act of mentioning (Saka 1998)—or in fact the mere presentation of the expression with all its

[11] Note that predicational and presentational quotational contexts allow the quoted expression to be replaced by a special quantifier, as in the valid inferences from (31a), (32a), and (34a) to the sentences below:

(i) a. There is something they called him.
b. There is something he said.
c. The French adjective "rouge" means something.

formal, semantic, and contextual aspects. This is thus the approach to be adopted for the quotational context of reifying terms. Note that this means that the semantic analysis of reifying terms will ultimately have to be embedded within a use-theoretic semantics theory based on the sorts of acts performed by uttering expressions in particular syntactic contexts and not just their meaning or reference.

5. Number-referring terms and simple numerals

Number-referring reifying terms such as *the number two* constitute a particularly interesting case, with implications for the concept of number itself. Number-referring reifying terms involve two conceptions of numbers with one being more fundamental than the other is.

Number-referring terms are formed with simple numerals as denominative complements. There are several sorts of evidence to the effect that simple numerals do not in general act as referential terms referring to numbers, but rather retain the meaning they have when occurring as determiners or modifiers (as in *two children* or *the two children*). The semantic differences between simple numerals and explicit number-referring terms appear to match a particular view about the nature of numbers in the philosophy of mathematics, namely what Dummett called the *Adjectival Strategy*.

Simple numerals obviously occur primarily as determiners or modifiers of NPs, as in (35a, b) and only secondarily as (apparent) referential terms as in (35c):

(35) a. Eight women were invited.
b. The eight women were invited.
c. Eight is divisible by two.

Eight in (35c) has the (apparent) status of a referential term both because of its occurrence in the subject position of a sentence and because it occurs with a predicate that also applies to the referents of referential terms (such as *the number eight*).

The common view about occurrences of numerals as in (35c) is that they act as ordinary referential terms referring to numbers as abstract objects. Standard tests for referential terms customary among philosophers seem to support this view, for example Frege's criterion of being able to occur at both sides of the identity symbol and the possibility of replacing the numeral by a quantifier such as *something* (cf. Hale 1987):[12]

(36) a. The sum of two and six is eight.
b. If eight is divisible by two, then something is divisible by two.

However, these criteria are not conclusive as to the semantic role of such terms. There are criteria that distinguish between explicit number-referring terms and simple

[12] Hale's criterion is in fact considerably more complex, but it does involve special quantifiers.

numerals, to the effect that simple numerals should not be regarded as ordinary referential terms, but rather as quasi-referential terms.

5.1. Mathematical and non-mathematical properties

With certain types of predicates simple numerals and explicit number-referring terms are interchangeable, for example with those below:

(37) a. Four is divisible by two.
b. The number four is divisible by the number two.

(38) a. John added two to four.
b. John added the number two to the number four.

However, simple numerals and explicit number-referring terms do not share the same range of predicates with which they are acceptable. Three classes of predicates need to be distinguished regarding their behavior with number terms:

[1] Non-mathematical predicates
[2] Mathematical predicates
[3] Predicates describing agent-related mathematical operations.

I will start with non-mathematical predicates, since with them the difference between simple numerals and explicit property-referring terms is particularly striking. The difference is most apparent with relative-clause constructions containing non-mathematical predicates. The latter are strange with simple numerals, but fine with explicit number-referring terms:

(39) a. ?? Twelve, which interests me a lot, is an important number in religious and cultural contexts.
b. The number twelve, which interests me a lot, is an important number in religious and cultural contexts.

(40) a. ?? Twelve, which I like to write my dissertation about, is not a prime number.
b. The number twelve, which I like to write my dissertation about, is not a prime number.

(41) a. ?? Twelve, which I thought about a lot, is not divisible by five.
b. The number twelve, which I thought about a lot, is not divisible by five.

However, relative clauses modifying a simple numeral are fine when the predicate expresses a purely mathematical property:

(42) a. Twelve, which is divisible by two, is not a prime number.
b. Two, which is even, is a prime number.

As expected, if the sortal *number* occurs as part of a reifying predicate, non-mathematical predicates with simple numerals are acceptable:

(43) a. Twelve, which is a number that interests me a lot, . . .
b. Twelve, which is a number I like to write my dissertation about, . . .
c. Twelve, which is a number I thought about a lot, . . .

The difference between mathematical and non-mathematical predicates also manifests itself in the following constructions:

(44) a. ?? Twelve is what I write my dissertation about.
b. Twelve is a number I like to write my dissertation about.

(45) a. ?? I like to write my dissertation about twelve.
b. I like to write my dissertation about the number twelve.

What characterizes predicates like *interest me, write about*, or *think about*? They are intentional object-oriented predicates and thus express relations outside of the mathematical context. In fact, it appears that in general non-mathematical predicates are excluded with simple numerals.

Not all, but only some, mathematical predicates behave differently with explicit number-referring terms and with simple numerals. Before looking at arithmetical statements themselves, let us first attend to one particular number-related predicate, namely the verb *count*, a verb that distinguishes between simple numerals and explicit number-referring terms. *Count* accepts as complements only simple numerals, but not explicit number-referring terms, at least not on the relevant reading:

(46) a. Every day, John has to count the visitors. Today, he counted ten; yesterday, he counted two; before yesterday, he counted zero.
b. ?? John counted the number ten.

In (46a), *count*, with a simple numeral, displays an intensional reading: John may have counted ten, even if there were only nine individuals he tried to count. The reading of *count* in (46a) is quite different. If when counting the visitors, John counted ten, he did not count the number ten. If John counted the number ten, then (if he counted correctly) he must have counted one, rather than ten.

Why does *count* require simple numerals and not allow for explicit number-referring terms on the relevant reading? Given the lexical meaning of *count*, there is a straightforward explanation. *Count* as an accomplishment verb as in (46a) describes an action that results in the attribution of a plural property to a plurality. Counting a plurality does not require assigning it a number as an object, but only attributing a plural property. If the verb *count* expresses counting in the latter sense, this explains the restriction to simple numerals and the resistance of explicit number-referring terms. Only the simple numeral expresses a plural property, but not the explicit number-referring term.

Certain arithmetical statements display the same restriction to simple numerals, and an explanation of the restriction is available for those cases as well. These are in

particular sentences describing mathematical operations on two or more numbers. Thus, whereas (47a) is the natural way of expressing addition, (47b) is very strange:

(47) a. Two and two is four.
b. ?? The number two and the number two is the number four.

The examples below display similar if less striking contrasts:

(48) a. Two plus two is four.
b. ? The number two plus the number two is the number four.

(49) a. Two times two is four.
b. ? The number two times the number two is the number four.

(50) a. Four minus two is two.
b. ? The number four minus the number two is the number two.

The contrast holds in the same way for explicit number-referring terms not containing a numeral:

(48) c. ?? The first number and the second number is the third number.

(49) c. ? The first number times the second number is the third number.

(50) c. ? The first number minus the second number is the third number.

The way mathematical formulae like "2 + 2 = 4" are expressed in natural language thus does correspond to the syntax of the mathematical formula itself. In the mathematical formula, "2" and "4" are singular terms that stand for numbers as objects, "+" is a two-place functor, and "=" the two-place predicate expressing identity among objects. In arithmetical statements in English, *and* and even *plus* do not seem to act as functors taking singular terms, and *is* does not seem to express identity among objects. Yet, syntactically, *two plus two* occurs as a normal subject, and *is* as a predicate taking *four* as its complement.

This does not mean that arithmetical statements in natural language have a fundamentally different semantics from that of the corresponding mathematical formula. There are also views within the philosophy of mathematics according to which arithmetical formulae do not presuppose numbers acting as objects and numerals do not act as terms referring to numbers. This is what I will turn to now.

5.2. The Adjectival Strategy

The failure of interchangeability of simple numerals and explicit number-referring terms indicates that simple numerals are simply not terms referring to pure numbers, but rather retain the meaning they have when occurring as determiners or rather noun modifiers. Such a view has been proposed for linguistic reasons by Hofweber (2005a). Hofweber's motivation was to account for the general linguistic fact that numerals

occur both as determiners and as singular terms. Thus, Hofweber proposed that in arithmetical statements like (51a) the numeral retains its meaning as a quantifier, and the sentence itself is a generic sentence, with a meaning indicated by the paraphrase in (51b):

(51) a. Two and two is four.
b. Two things and two things are four things.

Hofweber argues that numerals undergo "cognitive type shift": they retain their meaning as (generalized) quantifiers, but syntactically they become singular terms, for the purpose of facilitating arithmetical calculation.

The view that numerals do not semantically act as singular terms referring to numbers has also been explored for purely philosophical reasons by philosophers of mathematics such as Bostock (1974), Gottlieb (1980), and Hodes (1984, 1990). Following Dummett (1995), it has become known as the "Adjectival Strategy." Given the Adjectival Strategy, (52a) is best paraphrased as below:

(52) a. If there are (were) two things and two other things, then there would be four things.

The Adjectival Strategy must make use of modality to account for a domain that is too small to make the relevant sentences true (or rather false).

Using plural logic, (52a) can be formalized as in (52b), where "xx" and "yy" are plural variables able to stand for several individuals at once, and "≤" symbolizes the "is/are some of" relation:

(52) b. $\Box(\exists xx\exists yy(R_2(xx) \,\&\, R_2(yy) \,\&\, \neg\exists z(z \leq xx \,\&\, z \leq yy)) \rightarrow \forall xx\forall yy(R_2(xx) \,\&\, R_2(yy) \,\&\, \neg\exists z(z < xx \,\&\, z < yy) \rightarrow \exists ww(R_4(ww) \,\&\, xx \leq ww \,\&\, yy \leq ww \,\&\, \neg\exists z(z \leq ww \,\&\, \neg\, z \leq xx \,\&\, \neg\, z < yy))))$

That is: "in any world in which there are two things and a different two things, for any two things and a different two things, there are four things consisting of just them."

Numerals will then take as their semantic values plural properties. To formalize (52a) as (52b), *and* and the copula *is* need to be treated as a semantic unit, expressing the following three-place relation among number relations:

(53) $[\textit{and, is}] = \lambda R'R''R'''[\Box\ (\exists xx\exists yy(R'(xx) \,\&\, R''(yy) \,\&\, \neg\exists z(z \leq xx \,\&\, z \leq yy)) \rightarrow \forall xx\forall yy(R'(xx) \,\&\, R''(yy) \,\&\, \neg\exists z(z \leq xx \,\&\, z \leq yy) \rightarrow \exists ww(R'''(ww) \,\&\, xx \leq ww \,\&\, yy \leq ww \,\&\, \neg\exists z\ (z \leq ww \,\&\, \neg\, z \leq xx \,\&\, \neg\, z \leq yy))))]$

Both *and* and *is* are thus treated as syncategorematic expressions.

In addition, one-place functors can be accounted for that way. For example, *successor* can be defined as follows:

(54) $[\textit{successor of } t] = \lambda R'\lambda R''[\forall xx\ \forall yy(R'(xx) \,\&\, R''(yy) \,\&\, xx \leq yy \rightarrow \exists!z\ (s < yy \,\&\, \neg\, z < xx))]$

That is, the successor of a plural property is a plural property that holds of pluralities with just one more element.

The generalization presented in the previous section adds strong linguistic evidence for the Adjectival Strategy. The Adjectival Strategy obviously can apply only to mathematical predicates and functors and not to non-mathematical ones such as intentional object-related predicates. But how can one make sense of the Adjectival Strategy from a linguistic point of view? Hodes (1990) has shown how a formal language of arithmetic can be interpreted within the Adjectival Strategy, so that number terms do not designate numbers, but "encode" quantifiers. Similarly, in the context of natural language, it is possible to take NPs that fulfill a range of criteria for "singular terms" not to refer to objects, but rather to express concepts, a generalized quantifier, or a plural property, or in fact to just have a syncategorematic function. The predicate then will not express a property of objects, but rather, as a syncategorematic expression, act together with the contribution of the NP to yield the overall meaning of the sentence. Thus, the predicate with simple numerals will have a different meaning than when it occurs with referential NPs. As we have seen, *is* with simple numerals has a different meaning than when it occurs with a referential NP as subject. The same holds for *and*, which with numerals will have a different meaning than when it occurs with referential NPs. Natural language predicates and connectives that can occur in arithmetical contexts thus are generally polysemous and display a special meaning when they are used to make arithmetical statements.

Not all arithmetical statements display a restriction to simple numerals, though. One-place mathematical predicates as well as comparative mathematical predicates are shared by simple numerals and explicit number-referring terms:[13]

(55) a. Ten is even/finite.
b. The number ten is even/finite.

Explicit number-referring terms are truly referential NPs referring to objects. The question then is: why are at least some mathematical predicates acceptable with explicit number-referring terms and do not require non-referential subjects or objects? To address this question, more needs to be said about the status of the number objects that explicit number-referring terms make reference to.

5.3. Explicit number-referring terms

The data discussed so far support a particular view of levels of involvement of numbers as objects. At a primary level, that of basic arithmetical operations with natural

[13] Also mathematical one-place functors are applicable both to simple numerals and explicit number-referring terms:

(i) a. the root/successor/predecessor of four
b. the root/successor/predecessor of the number four

numbers, the Adjectival Strategy is present and numbers in fact do not occur as objects. At the next level, the level of certain one-place mathematical properties as well as agent-related mathematical operations, the Adjectival Strategy as well as reference to numbers as objects is permitted. Finally, at a third level, that of non-mathematical properties and relations, the Adjectival Strategy is not available anymore, but only reference to numbers as objects.

This picture supports an account assimilating numbers to fictional characters. The parallels with fictional characters are strong, given a view of fictional entities such as that of Kripke (1973), Searle (1979), or van Inwagen (2000). On that view, there is only pretend reference within the story, where "nuclear" properties are attributed to an individual the author pretends to refer to. However, reference to a fictional character takes place as soon as "extranuclear" properties are predicated of the individual described in the story (or better, properties are predicated of the individual from outside the context of the story).[14] "Living on Baker Street" and "being a detective" are nuclear properties of Sherlock Holmes; properties such as "being a frequently cited fictional character," "being created by Sir Arthur Conan Doyle," and "existing only in the story" are extranuclear properties. While in purely mathematical contexts, given the Adjectival Strategy, there is neither reference nor pretend reference, mathematical properties certainly side with nuclear properties on the nuclear–extranuclear distinction. Non-mathematical properties, by contrast, side with extranuclear properties, and thus they require reference to numbers as objects. Numbers as objects of reference thus enable the attribution of non-mathematical predicates, just like fictional characters as objects of reference enabled the attribution of extranuclear properties. Numbers as objects can have certain mathematical properties, namely one-place mathematical properties as well as agent-related properties. Fictional characters do not "have" the properties attributed to them in the story (otherwise conflicts might arise with certain extranuclear properties they might have); rather they "hold" the properties, as van Inwagen (2000) puts it. Similarly, numbers, one might say, do not "have" the properties that can be read off the mathematical context, but rather "hold" them.

Fictional characters depend entirely for their existence and identity on the story and its context. However, this does not mean fictional characters themselves are "created." Rather, as Schiffer (1996) has argued, once the story exists in a world, the fictional character exists there as well, whether or not anyone has conceived of it or referred to it. Fictional characters thus are "language-created, language-independent objects" (Schiffer 1996). The use of a referential term referring to a fictional character does not bring it into existence but simply enables epistemic access to it. The same can be said about a plausible fictionalist account of numbers. Once there are the mathematical

[14] The distinction between nuclear and extranuclear predicates is ultimately better replaced by a distinction between two ways of predication, external predication and internal predication. The reason is that one and the same predicate can be predicated of a fictional character externally, from outside the story, and internally, from inside the story, for example predicates like *is well-known*.

contexts in which numbers have "adjectival status," numbers as objects can be read off those contexts. The use of explicit number-referring terms simply enables reference to them. Numbers as objects of reference enable the attribution of non-mathematical predicates, just like fictional characters as objects of reference enable the attribution of extranuclear properties.

Returning now to explicit number-referring terms, a remaining question is, why do the numbers they refer to have (or rather "hold") some mathematical properties but not others?

Both explicit number-referring terms and simple numerals are possible with agent-related mathematical operations. There is a straightforward explanation for that: agent-related mathematical operations involve both the intentionality of actions (and thus a non-mathematical aspect) and a purely mathematical function; the former licenses explicit number-referring terms, and the latter makes simple numerals acceptable. Licensing of simple numerals comes from the arithmetical aspect, licensing of explicit number-referring terms from the intentional aspect.

Predicates like *even* or *finite* are generally defined in terms of mathematical operations, requiring simple numerals. But their content (unlike that of *plus* or *times*) is derivative upon such operations. It can equally well be defined as a property of numbers as objects: the number *n* has (or "holds") a property *P* just in case the numeral corresponding to *n* plays such and such a role in a particular mathematical operation in terms of which *P* is defined.

Numbers as objects of reference of explicit number-referring terms will not systematically obtain all their properties from the corresponding numeral. Rather, like fictional characters, they have properties of their own. Some of them may be definable by using the corresponding numeral; others are simply supervenient on the role that the content of the numeral plays in various possible mathematical contexts and in various mathematical and non-mathematical uses of it.

6. Color-referring terms

The case of color-referring reifying terms is not very obvious to handle. The main question is, what kind of object should a color be, and how do *green* and *the color green* differ in reference? I will restrict myself to mentioning a few observations that will impose general conditions on how the referents of the two kinds of color terms are to be conceived.

First, one might think that a color term like *green* should be a term for a kind of trope like *wisdom*, that is, a term plurally referring to the various possible greenness tropes. *The color green* then would reify such a plurality as a single entity, just as *the property of wisdom* does with the plurality that *wisdom* stands for. The problem is that simple color words do not behave like kind terms. They contrast in that respect with the corresponding nominalizations of color adjectives such as *greenness*. Thus, simple color words do not trigger a reading existentially quantifying over instances with episodic predicates, as in (56a), as opposed to (56b):

(56) a. ?? John noticed green.
b. John noticed greenness.

Furthermore, evaluative predicates appear to be understood as evaluating the color as a whole rather than its instances, as in (57a), as opposed to (57b), which has a distributive interpretation:

(57) a. Green is nice.
b. Greenness is nice.

Moreover, instance-distribution predicates are hardly applicable to simple color words, in contrast to the corresponding adjective nominalization:

(58) a ?? Green is rare.
b. Greenness is rare.

Simple color words like *green* thus differ from adjective nominalizations like *greenness*, in that the latter classify as terms standing for a kind of trope (just like *happiness* or *wisdom*).

There are also semantic differences among the corresponding definite noun phrases, such as *the green of the apple* and *the greenness of the apple*. The former can appear in predicate position, but the latter cannot:

(59) a. John painted the car the green of this apple.
b. ??? John painted the car the greenness of this apple.

In fact, *the green of the apple* does not refer to the trope that would be "the greenness of the apple." Rather it refers to a universal, "green" as instantiated by the apple.

What then do simple color words like *green* stand for? Certainly, they cannot just stand for abstract objects, since they can be quantized:

(60) a. John added some green.
b. There is more green in this picture than in that one.

One might speculate that simple color terms stand for kinds of bearer-less tropes, tropes that can be shared by different objects and that can be quantized. Such tropes may in fact just be quantities of paint, as in (60a, b), given that these, arguably, are perceived as bearer-less.

Simple color words and explicit color-referring terms do not differ much in the sorts of predicates or readings of predicates they allow, unlike in the case of terms for numbers and expressions. However, there are some differences here as well. The predicate *contain* as in (61), for example, allows for simple color words, but is less acceptable with explicit color-referring terms:

(61) a. The mixture of paint contains red and green.
b. ?? The mixture of paint contains the color red and the color green.

This indicates that the referent of an explicit color-referring term such as *the color green* is in fact more abstract than what the simple color word *green* stands for and does not share the properties of concrete entities that the referent of the denominative complement *green* may have.

7. Syntactic indicators for quasi-referential terms

7.1. Replacement by special quantifiers

Some of the expressions that can act as denominative complements of reifying terms are non-referential expressions, for example simple numerals, simple color words, and *that*-clauses. Yet those expressions can appear in syntactic positions in which also referential NPs can appear, namely as subjects and as objects of predicates that generally require referential terms. When appearing in such contexts, the expressions thus classify as quasi-referential terms. In their occurrence as quasi-referential terms, they can be replaced by special quantifiers. Examples of special quantifiers taking the place of simple numerals and simple color words are given below:[15]

(62) a. John prefers green. Mary prefers the same thing.
b. John added something to something else, namely he added ten to twenty.

However, what do such occurrences of special quantifiers range over? Given that bare numerals do not stand for kinds of pluralities, as we have seen, special quantifiers replacing bare numerals should not range over kinds of pluralities either. Given the last section, it is also not obvious that simple color words stand for kinds. Note, moreover, that special quantifiers can be count quantifiers when replacing simple numerals and simple color words:

(63) a. John added several things, three, two, and five.
b. John compared two things, red and yellow.

This is incompatible with the view that special quantifiers are (first-level) plural quantifiers ranging over pluralities of individuals, such as kinds viewed as modalized pluralities. Rather, special quantifiers should range over single objects.

A plausible view of special quantifiers replacing simple numerals and simple color words is that they range over the same objects that would be introduced by the corresponding reifying terms. Given their replacement of quasi-referential terms, such occurrences of special quantifiers should then be considered nominalizing quantifiers, involving the mapping of a possible value of a simple number or color word onto the object that is its reification.

[15] The replacement of *that*-clauses by special quantifiers was already discussed in Chapters 1 and 4, where it was argued that such a replacement generally leads to the introduction of attitudinal objects or kinds of them.

7.2. Syntactic peculiarities of quasi-referential terms

It appears that referential and quasi-referential terms are also distinguished syntactically in some languages. I mention two syntactic particularities of quasi-referential terms. One of them is their inability to support plural anaphora, a peculiarity that manifests itself particularly well in German. Another consists in a certain choice between two types of relative pronouns in German.

7.2.1. Support for plural anaphora A conjunction of quasi-referential terms does not or does not easily support plural anaphora, unlike a conjunction of the corresponding reifying terms. By contrast, the conjunction of the corresponding reifying terms does support plural anaphora. Moreover, a conjunction of quasi-referential terms does support full NPs acting as anaphora, that is, NPs with a suitable sortal as head:

(64) a. John acquired wisdom and experience. Mary acquired ?? them/ok those properties too.
b. John recognized that Mary is gifted and that Sue is ambitious. Bill recognized ??? them/these facts too.

(65) a. ??? John wrote down "Mary" and "Sue." Joe wrote them down too.
b. John wrote down the name "Mary" and the name "Sue." Joe wrote them down too.
c. John wrote down "Mary" and "Sue." John wrote these names down too.

There are differences, though, in the degree of unacceptability of a plural anaphor. Conjunctions of bare adjective nominalizations and *that*-clauses truly resist plural anaphora, as do conjunctions of quotations and simple color words. By contrast, intuitions are less sharp about conjunctions of simple numerals and color words. There are also language-particular differences. For example, in English, support of plural anaphora with conjunctions of simple numerals and color words is more acceptable than it is in German. Thus, (66a) contrasts with (66b) and (66c), (67a) with (67b) and (67c), and (68a) with (68b) and (68c), but not so for the English translations:

(66) a. Fünf und sieben sind nicht durch zwei teilbar. ?? Sie sind auch nicht durch drei teilbar.
"Five and seven are not divisible by two. They are not divisible by three either."
b. Die Zahlen fünf und die Zahl sieben sind nicht durch zwei teilbar. Sie sind auch nicht durch drei teilbar.
"The number five and the number seven are not divisible by two. They are not divisible by three either."
c. Fünf und sieben sind nicht durch zwei teilbar. Diese Zahlen sind auch nicht durch drei teilbar.

"Five and seven are not divisible by two. These numbers are not divisible by three either."

(67) a. ??? Hans addierte zehn und zwanzig. Maria addierte sie auch.
"John added ten and twenty. Mary added them too."
b. Hans addierte die Zahlen zehn und zwanzig. Maria addierte sie auch.
"John added the numbers ten and twenty. Mary added them too."
c. Hans addierte zehn und zwanzig. Maria addierte diese Zahlen auch.
"John added ten and twenty. Mary added those numbers too."

(68) a. ??? Hans mag Grün und Rot. Maria mag sie auch.
"John likes green and red. Mary likes them too."
b. Hans mag die Farbe Grün und die Farbe Rot. Maria mag sie auch.
"John likes the color red and the color green. Mary likes them too."
c. Hans mag Grün und Rot. Maria mag diese Farben auch.
"John likes green and red. Mary likes these colors too."

Why there are such language-particular differences is puzzling and remains of course to be investigated.

7.2.2. Two kinds of non-restrictive relative clauses in German The second indication of the quasi-referential status of an expression comes from the choice between two types of relative pronouns in German. German has two distinct types of relative pronouns. The first type, let us call it *w-pronouns*, consists in the pronoun *was*. *Was* occurs with sortal-free quantifiers as in *alles, was*; *nichts, was*; *vieles, was* ("everything that," "nothing that," "many things that"). The second type, let us call it *d-pronouns*, consists in *das, der, die* (singular feminine), and *die* (plural). D-pronouns cannot introduce relative clauses modifying a sortal-free quantifier such as *alles, vieles*, or *nichts*. They can introduce only relative clauses modifying an NP with a sortal as head, as in *der Mann, der* ("the man who"); *die Frau, die* ("the woman who"); *das Kind, das* ("the child that"); *die Leute, die* ("the people that"), or else a proper name, as in *Hans, der* ("John, who"). However, not all NPs with a sortal as head can be modified by relative clauses introduced by a d-pronoun. Predicative NPs with sortal head nouns can be modified only by relative clauses introduced by w-pronouns, not by d-pronouns:

(69) a. Hans wurde ein erfolgreicher Künstler, was/⋆das Maria nicht wurde.
"John became an important artist, which Mary did not become."

In addition, adjectival predicative complements can be modified only by relative clauses introduced by w-pronouns, not by d-pronouns:

(69) b. Hand wurde weise, was/⋆ das Maria bereits war.
"John became wise, which Mary already was."

They differ in that respect from explicit property-referring terms (with the sortal *property*), which require d-pronouns:

(69) c. Hans hat die Eigenschaft, weise zu sein, die/* was Maria auch hat.
"John has the property of being wise, which Mary has too."

Thus, the two types of relative pronouns distinguish between referential NPs on the one hand and predicative complements on the other hand.

The two types of relative pronouns also distinguish between referential and quasi-referential terms. First, they distinguish simple *that*-clauses from reifying terms like *the fact that* S or *the proposition that* S. The former require w-pronouns, whereas the latter require d-pronouns:

(70) a. Hans hat erwaehnt, dass die Sonne schien, was/* das Maria nicht erwähnt hatte.
"John has mentioned that the sun is shining, which Mary has not mentioned."
b. Hans hat die Tatsache, dass die Sonne schien, erwähnt, die/* was Maria nicht erwähnt hatte.
"John has mentioned the fact that the sun is shining, which Mary has not mentioned."

Furthermore, w-pronouns and d-pronouns distinguish between simple quotations and color words on the one hand and the corresponding reifying terms on the other hand:

(71) a. "Maria," was/* der der Name dieser Frau ist, . . .
"'Mary,' which is the name of this woman . . . "
b. Der Name "Maria," der der Name dieser Frau ist, . . .
"The name 'Mary,' which is the name of this woman, ..."

(72) a. Grün, was/* das meine Liebingsfarbe ist, . . .
"Green, which is my favorite color, . . . "
b. Die Farbe Grün, die meine Lieblingsfarbe ist, . . .
"The color green, which is my favorite color, . . . "

Finally, the two kinds of relative pronouns distinguish between simple numerals and explicit number-referring terms:

(73) a. Zwölf, was/* das/*? die eine Zahl ist, die mich sehr interessiert, . . .
"Twelve, which is a number that interests me a lot, . . . "
b. Zwölf, was/* das/* die durch zwei teilbar ist, . . .
"Twelve, which is divisible by two, . . . "
c. Die Zahl zwölf, die/* was durch zwei teilbar ist, . . .
"The number twelve, which is divisible by two, . . . "

The distinction between w-pronouns and d-pronouns thus classifies *that*-clauses, quotations, simple color words, and simple numerals as non-referential, and given

the occurrences of those expressions in positions in which also referential terms can appear, as quasi-referential.[16]

8. Conclusion

The aim of this chapter was to show that reifying terms form a uniform class both formally and semantically. Their formal structure motivates a particular account of their semantics. Reifying terms generally introduce an entity on the basis of their denominative complement, a non-referential occurrence, which is a mere mention of an expression. There is then a variety of ways in which such a presentation of an expression can be taken into account in order to introduce an object, by exploiting its formal, semantic, or contextual aspects.

With the exception of a proper name, the expression acting as the denominative complement is a quasi-referential expression. That is, it can occur with predicates with which also referential expressions can occur; yet its semantic function is not a referential one. The quasi-referential function manifests itself formally, by the choice of free relative clauses in German or their lack of support of plural anaphora.

The form of reifying terms, definite determiner—reifying sortal—quasi-referential term, allows in principle for a range of combinations of expressions. There are some combinations, though, that should form reifying terms, but at least in English do not function that way. Thus, whereas (74a), (75a), (76a), and (76b) are well-formed reifying terms, (74b, c, d), (75b), (77a), and (77b) are not:

[16] There are other singular terms that may classify as non-referential, but whose non-referential status is harder to make sense of. Names for times and certain types of places are cases in point. For example, in German names for years and for cities go with w-pronouns, not d-pronouns, in contrast to the corresponding close apposition:

(i) a. 1930, was/⋆ das ein interessantes Jahr war, . . .
"1930, which was an interesting year, . . . "
b. Das Jahr 1930, das mich sehr interessiert, . . .
"The year 1930, which interests me a lot, . . . "

(ii) a. Paris, was/⋆ das mir gut gefällt, . . .
"Paris, which I like a lot, . . . "
b. Die Stadt Paris, die/⋆ was mir gut gefällt, . . .
"The city of Paris, which I like a lot, . . . "

Like simple numerals, simple names for years are not suited for referring to the objects of attitudes, unlike the corresponding close apposition:

(iii) a. ?? 1930, which I thought about a lot
b. The year 1930, which I thought about a lot

(iv) a. ?? I wrote about 1930, which had interested me a lot.
b. I wrote about the year 1930, which had interested me a lot.

The question why simple names for places and times behave as quasi-referential terms remains to be investigated.

One might think of an explanation in the case of cities, namely that cities as entities are underspecified (they may be considered either spatial or political units, for example). However, such an explanation could not apply to names for times.

(74) a. the sentence "Mary likes Bill"
b. * the sentence that Mary likes Bill
c. * the fact "Mary likes Bill"
d. * the possibility "Mary likes Bill"

(75) a. the word "red"
b. * the property red

(76) a. the concept horse
b. the concept of a horse

(77) a. * the meaning horse
b. * the meaning of a horse

Different sorts of constraints appear to be at play in ruling out the unacceptable examples. Some reifying sortals, it appears, can form only type 1 reifying terms (*fact, possibility, property*) or only type 2 reifying terms (*sentence, word*); others can form both sorts of terms (*concepts*); yet others can form neither (*meaning*).[17] The semantic account of reifying terms sketched in this chapter clearly is not yet sufficiently constrained and a proper syntactic analysis of the constructions remains to be developed.

[17] There is also cross-linguistic variation. Thus, in French both (ia) and (ib) are possible, whereas English permits only the construction in (ia):

(i) a. le mot "mère"
the word "mother"
b. le mot de mère
the word of mother

Moreover, in German, reifying city names are of type 2, whereas in English, they are of type 1:

(ii) a. die Stadt Berlin
the city Berlin
b. the city of Berlin

Conclusion and Outlook

The overall aim of this book was a re-evaluation of expressions apparently making reference to abstract objects. One major result was that natural language does not so much display reference to abstract objects, but rather reference to a greater range of particulars than commonly thought. In fact, natural language displays a rather rich ontology of spatio-temporally coincident entities. First, natural language displays a great variety of tropes, such as quantitative tropes and complex tropes of various sorts. Second, it displays the distinction between "actions" and their non-enduring "products," especially for propositional attitude verbs and intensional transitive verbs. We have also seen that the ontology of natural language displays a fundamental distinction between events and tropes on the one hand and states and facts on the other hand. Whereas the former fulfill various criteria for concreteness, the latter are abstract in a relevant sense. Finally, the ontology of natural language also involves variable objects, objects that may have different manifestations as different entities in different circumstances. Universals play a role in the ontology of natural language as pluralities of possible particulars and as derivative entities obtained by a form of abstraction from non-referential occurrences of expressions.

This overall ontological view goes along with new analyses of what were considered non-referential complements, in particular clausal complements of attitude verbs and NP complements of intensional transitive verbs.

In various places, this book made use of concepts and views that are in need of further elaboration or else invite further development. Thus, plural reference if it is used for the analysis of kind terms as in Chapter 1 should be applied more generally to the great range of phenomena involving ordinary plurals. Plural reference has so far been of interest primarily to philosophical logicians. But we have seen that there are good motivations from natural language for pursuing it as an alternative account to the more common analysis of plurals as terms referring to pluralities of some sort. Of course, to develop a rival to current theories of plurals based on reference to plural objects with their numerous applications will be a significant challenge.

Also the analysis of attitude reports that was proposed invites much further development, in particular regarding the nature and configuration of propositional constituents that enter into multigrade attitudinal relations and help form attitudinal objects. There are many issues to be explored in the light of the overall approach, such as various sorts of context-dependency, issues concerning reference, presuppositions, and quotation.

The analysis of intensional transitive verbs involved the relation of satisfaction that holds between a situation and a "product" of the event described by an intensional transitive verb, such as a need or a promise. The extent to which truthmaking or satisfaction in this sense plays a role in the context of natural language semantics has not been much explored in the existing philosophical literature and invites much further investigation.

The analysis of reifying terms of the various sorts involved a crucial appeal to philosophical views of strategies of the introduction of objects based on expressions, concepts, or uses of expressions, such as conceptions of pleonastic entities or entities introduced by abstraction. There is a significant philosophical literature on this topic, especially in the philosophy of mathematics. While philosophical views making use of such strategies are hardly uncontroversial, the book had to restrict itself to discussing the syntactic structure and the semantic behavior of NPs that appear to be a reflection of such strategies.

References

Aristotle: *Categories*. Translation in J. Barnes, ed. (1984): *The Complete Works of Aristotle*, Volumes I and II. Princeton, NJ: Princeton University Press.

Armstrong, D. (1997): *A World of States of Affairs*. Cambridge: Cambridge UP.

—— (2004): *Truth and Truthmakers*. Cambridge: Cambridge UP.

Asher, N. (1987): *Reference to Abstract Objects in Discourse*. Dordrecht: Reidel.

—— (1993): *Reference to Abstract Objects*. Dordrecht: Kluwer.

Audi, R. (1998): *Epistemology: A Contemporary Introduction to the Theory of Knowledge*. London: Routledge.

Austin, J. L. (1962): *Sense and Sensibilia*. Edited by G. Warnock. Oxford: Clarendon Press.

—— (1965): How to *Do Things with Words*. Oxford: Oxford UP.

Bach, K. (1997): "Do Belief Reports Report Beliefs?" *Pacific Philosophical Quarterly* 78, 215–41.

Bacon, J. (1995): *Universals and Property Instances—The Alphabet of Being*. Oxford: Blackwell.

Baker, M. C. (1988): *Incorporation: A Theory of Grammatical Function Changing*. Chicago, IL: Chicago UP.

Barcan Marcus, R. (1972): "Quantification and Ontology," *Nous* 6.3, 240–50.

—— (1978): "Nominalism and the Substitutional Quantifier," The Monist 71, 351–62.

Bealer, G. (1982): *Quality and Concept*. Oxford: Clarendon Press.

Benacerraf, P. (1965): "What Numbers Could not Be," *Philosophical Review* 74, 47–73.

Bennett, J. (1988): *Events and their Names*. Oxford: Clarendon Press.

Betti, A. (2010): "Kazimierz Twardowski," *Stanford Encyclopedia of Philosophy*. [Online]. Available: <http://plato.stanford.edu/>.

Bigelow, J. (1988): *The Reality of Numbers*. Oxford: Clarendon Press.

Bobryk, J. (2009): "The Genesis and History of Twardowski's Theory of Actions and Products." In S. Lapointe et al. (eds.) *The Golden Age of Polish Philosophy. Kazimierz Twardowski's Philosophical Legacy*. Berlin: Springer, 33–42.

Boolos, G. (1984): "To Be Is to Be the Value of a Variable (or to Be the Values of Some Variables)," *Journal of Philosophy* 81, 430–49.

—— (1985): "Nominalist Platonism," *Philosophical Review* 94, 327–44.

Bostock, D. (1974): *Logic and Arithmetic: Natural Numbers*. Oxford: Clarendon Press.

Campbell, K. (1990): *Abstract Particulars*. Oxford: Blackwell.

Carlson, G. (1977): "A Unified Analysis of the English Bare Plural," *Linguistics and Philosophy* 1, 413–57.

Carlson, G. and J. Pelletier (1995): *The Generic Book*. Chicago, IL: Chicago UP.

Chierchia, G. (1998): "Reference to Kinds across Languages," *Natural Language Semantics* 6, 339–405.

—— and R. Turner (1988): "Semantics and Property Theory," *Linguistics and Philosophy* 11, 261–302.

Chisholm, R. M. (1957): *Perceiving: A Philosophical Study*. Ithaca, NY: Cornell University Press.

Chomsky, N. (1981): *Lectures on Government and Binding*. Cambridge, MA: MIT Press.

Cresswell, M. (1985): *Structured Meanings*. Cambridge, MA: Bradford.

—— and A. v. Stechow (1982): "*De re* Belief Generalized," *Linguistics and Philosophy* 5, 503–35.

Crimmins, M. and J. Perry (1989): "The Prince and the Phone Booth," *The Journal of Philosophy* 86, 685–711.

Davidson, D. (1980): "The Logical Form of Action Sentences." In D. Davidson: *Essays on Actions and Events*. Originally in N. Rescher (ed.) *The Logic of Decision and Action*. Pittsburgh, PA: Pittsburgh UP.

den Dikken, M., R. Larson, and P. Ludlow (1996): "Intensional 'Transitive' Verbs and Concealed Complement Clauses," *Rivista di Linguistica*, 8: 331–48; also (slightly abridged) in P. Ludlow (ed.) *Readings in the Philosophy of Language* (1997), 1041–53. Cambridge, MA: MIT Press.

Devitt, M. (1980): "Ostrich Nominalism or Mirage Realism?" *Pacific Philosophical Quarterly* 61, 433–49.

Diesing, M. (1992): *Indefinites*. Cambridge, MA: MIT Press.

Dubucs, J. and W. Miskiewics (2009): "Logic, Act and Product." In G. Primiero (ed.) *Knowledge and Judgment*. Berlin and Heidelberg: Springer Verlag, 85–108.

Dummett, M. (1973): *Frege. Philosophy of Language*. Vol. 1. London: Duckworth.

—— (1982): "Truth." In M. Dummett: *Truth and Other Enigmas*. Cambridge, MA: Harvard UP.

—— (1995): *Frege's Philosophy of Mathematics*. London: Duckworth.

Engel, R. E. (1989): "On Degrees." *Journal of Philosophy* 86, 23–37.

Fine, K. (1982a): "Acts, Events and Things." In W. Leinfellner et al. (eds.) *Language and Ontology*. Proceedings of the Eighth Wittgenstein Symposium. Hoelder-Pichler-Tempsky, Vienna.

—— (1982b): "First-order Modal Theories III—Facts," *Synthese* 53, 43–122.

—— (1999): "Things and Their Parts," *Midwest Studies of Philosophy* 23, 61–74.

—— (2000): "Neutral Relations," *The Philosophical Review* 109, 1–33.

Forbes, G. (1985): *The Metaphysics of Modality*. Oxford: Clarendon Press.

—— (2000): "Objectual Attitudes," *Linguistics and Philosophy* 23.2, 141–83.

—— (2006): *Attitude Problems*. Oxford: Oxford UP.

—— (online): "Intensional Transitive Verbs," *Stanford Encyclopedia of Philosophy*. Available: <http://plato.stanford.edu/>.

Frege, G. (1884): *Die Grundlagen der Arithmetik* (Foundations of Arithmetic).

—— (1892): "Funktion und Begriff." Reprinted in G. Patzig (ed.) *Funktion, Begriff, Bedeutung*. Goettingen: Vandenhoeck and Ruprecht.

—— (1918/9): "Thoughts." In B. McGuinness (ed.) *Collected Papers on Mathematics, Logic, and Philosophy*. Oxford: Blackwell. 351–72.

Gaskin, R. (2008): *The Unity of Propositions*. Oxford: Oxford UP.

Gillon, B. (1987): "The Readings of Plural Noun Phrases in English," *Linguistics and Philosophy* 10, 199–220.

Gonzalo-Pereyra, R. (2005): "Why Truthmakers?" In H. Beebee and J. Dodd (eds.): *Truthmakers: The Contemporary Debate*. Oxford: Oxford UP. 17–31.

Gottlieb, D. (1980): *Ontological Economy: Substitutional Quantification and the Philosophy of Mathematics*. Oxford: Oxford UP.

Griffin, N. (1985): "Russell's Multiple Relations Theory," *Philosophical Studies* 47, 213–47.

Grimshaw, J. (1979): "Complement Selection and the Lexicon," *Linguistic Inquiry* 10, 279–326.

Hale, B. (1987): *Abstract Objects*. New York: Blackwell.

Hanks, P. W. (2007a): "The Content-Force Distinction," *Philosophical Studies* 134, 141–64.
—— (2007b): "How Wittgenstein Defeated Russell's Multiple Relations Theory," *Synthese* 154, 121–46.
Higgins, F. R. (1973): *The Pseudo-Cleft Construction in English*. Indiana: Indiana University Linguistics Club.
Hintikka, J. (1962): *Knowledge and Belief. An Introduction to the two Notions*. Ithaca, NY: Cornell UP.
Hodes, H. (1984): "The Ontological Commitment of Arithmetics," *Journal of Philosophy* 81, 123–49.
—— (1990): "Where Do Natural Numbers Come from?" *Synthese* 84, 347–407.
Hofweber, T. (2005a): "Number Determiners, Numbers, and Arithmetic," *Philosophical Review* 114.2, 179–225.
—— (2005b): "A Puzzle about Ontology," *Nous* 39.2, 256–83.
Hussel, E. (1913–21): *Logische Untersuchungen*.
Iacona, A. (2003): "Are there Propositions?" *Erkenntnis* 58, 325–51.
Jackendoff, R. (1984): "On the Phrase 'the Phrase,'" *Natural Language and Linguistic Theory* 2.1, 25–37.
Jackson, F. (1977): "Statements about Universals," *Mind* 86, 343: 427–9.
Jubien, M. (2001): "Propositions and the Objects of Thought," *Philosophical Studies* 104, 47–62.
Kaplan, D. (1986): "Opacity." In L. E. Hahn and P. A. Schilpp (eds.) *The Philosophy of W. V. O. Quine*. La Salle, PA: Open Court.
Katz, G. (2003): "Events Arguments, Adverb Selection, and the Stative Adverb Gap." In E. Lang et al. (eds.) *Modifying Adjuncts*. Berlin: De Gruyter. 455–74.
Keenan, E. and E. Faltz (1985): *Boolean Semantics for Natural Language*. Dordrecht: Reidel.
Kim, J. (1976): "Events as Property Exemplifications." In M. Brand and D. Walton (eds.) *Action Theory*. Dordrecht: Kluwer. 159–77.
King, J. (2002): "Designating Propositions," *Philosophical Review* 111, 341–471.
—— (2007): *The Nature and Structure of Content*. Oxford: Oxford UP.
Kleiber, G. (1984): "Denomination et Relations Denominatives," *Languages* 76, 77–94.
Kratzer, A. (1995): "Stage-Level and Individual-Level Predicates." In G. Carlson and J. Pelletier (eds.) *The Generic Book*. Chicago, IL: Chicago UP. 125–76.
Krifka, M. (2004): "Bare NPs: Kind-referring, Indefinites, Both, or Neither?" Proceedings of Semantics and Linguistic Theory (SALT) XIII, University of Washington, Seattle. Edited R. B. Young and Y. Zhou. Ithaca, NY: CLC Publications.
—— et al. (1995): "Genericity: An Introduction," In G. Carlson and J. Pelletier (eds.) *The Generic Book*. Chicago, IL: Chicago UP.
Kripke, S. (1973): "Locke Lectures," MS, University of Princeton.
Levine, J. (2010): "Demonstrative Thought," *Mind and Language* 25.2, 169–95.
Levinson, J. (1978): "Properties and Related Entities," *Philosophy and Phenomenological Research* 39, 1–22.
—— (1980): "The Particularization of Attributes," *Australasian Journal of Philosophy* 58, 102–15.
Lewis, D. (1980): "Index, Content, and Context." In S. Kanger and O. Ohman (eds.) *Philosophy and Grammar*. Dordrecht: Kluwer. 79–100.
Link, G. (1983): "The Logical Analysis of Plurals and Mass Nouns." In R. Baeuerle et al. (eds.) *Semantics from Different Points of View*. Berlin: Springer. 302–23.

Link, G. (1998): "The Logical Analysis: A Lattice-Theoretical Approach." In R. Baeuerle et al. (eds.) *Meaning, Use, and Interpretation of Language*. Berlin: De Gruyter.

Locke, J. (1690): *An Essay Concerning Human Understanding*.

Longobardi, G. (1994): "Reference and Proper Names," *Linguistic Inquiry* 25(4), 609–65.

Loux, M. (1978): *Substance and Attribute*. Dordrecht: Kluwer.

——(1998): *Metaphysics. A Contemporary Introduction*. New York: Routledge.

Lowe, J. (1998): *The Possibility of Metaphysics*. Oxford: Oxford UP.

——(2006): *The Four-Category Ontology. A Metaphysics Foundation for Natural Science*. Oxford: Oxford UP.

MacBride, F. (2006): "Predicate Reference." In E. Lepore and B. Smith (eds.) *The Oxford Handbook of Philosophy of Language*. Oxford: Oxford UP.

Maienborn, C. (2007): "On Davidsonian and Kimian States." In I. Comorovski and K. Von Heusinger (eds.) *Existence: Semantics and Syntax*. Dordrecht: Springer. 107–30.

Manley, D. (2002): "Properties and Resemblance Classes," *Nous* 36, 1, 75–96.

Matthews. F. (1994): "The Measure of Mind," *Mind* 103, 410: 131–46.

——(2007): *The Measure of Mind*. Oxford: Oxford UP.

Matushansky, O. (2008): "On the Linguistic Complexity of Proper Names," *Linguistics and Philosophy* 31, 5: 573–627.

Maurin, A.-S. (2002): *If Tropes*. Dordrecht: Kluwer.

Mayberry, J. R. (2000): *The Foundations of Mathematics in the Theory of Sets*. Cambridge: Cambridge UP.

McCawley, James D. (1998): *The Syntactic Phenomena of English*. Chicago, IL: Chicago UP.

McGinn, C. (2000): *Logical Properties*. Oxford: Oxford UP.

McKay, T. (2006): *Plural Predication*. Oxford: Oxford UP.

Merz, D. W. (1996): *Moderate Realism and Its Logic*. New Haven, CT: Yale UP.

Mittwoch, A. (1998): "Cognate Objects as Reflections of Davidsonian Event Arguments." In S. Rothstein (ed.) *Events and Grammar*. Dordrecht: Kluwer. 309–32.

Moltmann, F. (1989): "Nominal and Clausal Event Predicates," *Proceedings of the Regional Meeting of the Chicago Linguistics Society (CLS)* 25, Dept. of Linguistics, Chicago University, Chicago.

——(1997a): *Parts and Wholes in Semantics*. New York: Oxford UP.

——(1997b): "Intensional Verbs and Quantifiers," *Natural Language Semantics* 5, 1: 1–52.

——(2003a): "Nominalizing Quantifiers," *Journal of Philosophical Logic* 32, 445–81.

——(2003b): "Propositional Attitudes without Propositions," *Synthese* 135, 70–18.

——(2004a): "Nonreferential Complements, Derived Objects, and Nominalizations," *Journal of Semantics* 13, 1–43.

——(2004b): "Two Kinds of Universals and Two Kinds of Collections," *Linguistics and Philosophy* 27, 739–76.

——(2004c): "Properties and Kinds of Tropes: New Linguistic Facts and Old Philosophical Insights," *Mind* 113, 1–43.

——(2005): "Two Kinds of Universals and Two Kinds of Groups," *Linguistics and Philosophy* 27, 739–76.

—— (2007): "Events, Tropes and Truthmaking," *Philosophical Studies* 134, 363–403.

—— (2008): "Intensional Verbs and Their Intentional Objects," *Natural Language Semantics* 16.3, 239–70.

—— (2009): "Degree Structure as Trope Structure: A Trope-Based Analysis of Comparative and Positive Adjectives," *Linguistics and Philosophy* 32, 51–94.

—— (2012): "Intensional Relative Clauses and the Notion of a Variable Object," *Proceedings of the 18th Amsterdam Colloquium* (2011). FOLLI Lecture Notes in Computer Science (LNCS), Springer.

—— (forthcoming a): "The Distinction between Abstract, Concrete States, and Tropes." In C. Beyssade, A. Mari, and F. del Prete (eds.) *Genericity*. Oxford: Oxford UP.

—— (forthcoming b): "Reference to Numbers in Natural Language," *Philosophical Studies*.

—— (forthcoming c): "Tropes, Bare Demonstratives, and Apparent Statements of Identity," *Nous*.

Montague, R. (1973): "The Proper Treatment of Quantification in English." In J. Hintikka et al. (eds.) *Approaches to Natural Language*. Dordrecht: Kluwer. 242–70. Also in R. Montague *Formal Philosophy*, edited by R. Thomason. New Haven, CT: Yale UP.

Moore, G. E. (1953): "Sense Data." In G. E. Moore, *Some Main Problems of Philosophy*. London: Allen and Unwin. 28–40.

Moore, J. G. (1999): "Propositions, Numbers, and the Problem of Arbitrary Identification," *Synthese* 120, 229–63.

Mulligan, K., P. Simons, and B. Smith (1984): "Truthmakers," *Philosophy and Phenomenological Research* 44, 287–321.

Ockham, W. V. (1392): *Summa Logicae*. Trans. M. J. Loux, *Ockham's Theory of Terms: Part I of the Summa Logicae*. Notre Dame, IN: University of Notre Dame Press.

Oliver, A. and H. Mellor (eds.) (1997): *Properties*. Oxford: Oxford UP.

Oliver, A. and T. Smiley (2004): "Multigrade Predicates," *Mind 113*, 609–80.

—— —— (2006): "A Modest Logic of Plurals," *Journal of Philosophical Logic* 35, 317–48.

Pesetsky, D. (1982): *Paths and Categories*. Cambridge, MA: MIT.

Prior, A. (1971): *Objects of Thought*. Oxford: Clarendon Press.

Pustejovsky, J. (1995): *The Generative Lexicon*. Cambridge, MA: MIT Press.

Quine, W. V. O. (1956): "Quantifiers and Propositional Attitudes," *Journal of Philosophy* 53.

—— (1960): *Word and Object*. Cambridge, MA: MIT Press.

Rayo, A. (2002): "Word and Object," *Nous* 36, 434–64.

—— (2006): "Beyond Plurals." In A. Rayo and G. Uzquiano (eds.) *Absolute Generality*. Cambridge, MA: MIT Press.

—— and S. Yablo, (2001): "Nominalism through De-Nominalization," *Nous* 35.1, 74–92.

Restall, G. (1996): "Truthmakers, Entailment, and Necessity," *Australasian Journal of Philosophy* 74, 331–40.

Richard, M. (2001): "Seeking a Centaur, Adoring Adonis: Intensional Transitives and Empty Terms." In P. French and H. Wettstein (eds.) *Figurative Language. Midwest Studies in Philosophy* Vol. 25. Oxford and New York: Blackwell, 103–27.

Rizzi, L. (1990): *Relativized Minimality*. Cambridge, MA: MIT Press.

Rodriguez-Pereyra, G. (2005): "Why Truthmakers?" In H. Beebee and J. Dodd (eds.) *Truthmakers: The Contemporary Debate*. Oxford: Oxford UP. 17–31.

Rosefeldt, T. (2006): "'That'-Clauses and Non-Nominal Quantification," *Philosophical Studies* 133, 301–33.

Russell, B. (1912): *The Problems of Philosophy*. London.

——(1913): *Theory of Knowledge*. The 1913 manuscript. Edited by E. Ramsden Eames. Unwin Hyman Ltd, reprinted in 1993 by Routledge, London.

——(1918): "The Philosophy of Logical Atomism." In B. Russell, *Logic and Knowledge*. London: Routledge.

Sainsbury, R. M. (1979): *Russell*. London: Routledge and Kegan Paul.

Salmon, N. (1987): "Existence," *Philosophical Perspectives* 1, 49–108.

Schaar, M. van der (2006): "On the Ambiguities of the Term Judgment. An Evaluation of Twardowski's Distinction between Action and Product." In A. Scrudzimski and D. Lukasiewicz (eds.) *Actions, Products and Things. Brentano and Polish Philosophy*. Frankfurt: Ontos Verlag. 35–53.

Schiffer, S. (1987): *Remnants of Meaning*. Cambridge, MA: MIT Press.

——(1990): "Meaning and Value," *Journal of Philosophy* 87 (11): 602–14.

——(1996): "Language-Created and Language-Independent Entities," *Philosophical Topics* 24.1, 149–67.

——(2003): *The Things We Mean*. Oxford: Clarendon Press.

Schlenker, P. (2003): "Clausal Equations (A Note on the Connectivity Problem)," *Natural Language and Linguistic Theory* 21, 157–214.

Schnieder, B. (2004): "A Note on Particularized Properties and Bearer-Uniqueness," *Ratio* 17, 218–28.

Schwarzschild, R. (1996): *Pluralities*. Dordrecht: Kluwer.

Searle, J. R. (1979): "The Logical Status of Fictional Discourse." In *Expression and Meaning: Studies in the Theory of Speech Acts*, repr. 1986. Cambridge: Cambridge UP.

Sharvit, Y. (1999): "Connectivity in Specificational Sentences," *Natural Language Semantics* 7, 97–123.

Sharvy, R. (1980): "A More General Theory of Definite Descriptions," *Philosophical Review* 89, 607–24.

Simons, P. (1987): *Parts. A Study in Ontology*. Oxford: Clarendon Press.

——(1994): "Particulars in Particular Clothing. Three Trope Theories of Substance," *Philosophy and Phenomenological Research* 54 (3): 553–74. Reprinted in S. Laurence and C. MacDonald (eds.) *Contemporary Readings in the Foundations of Metaphysics*. Oxford: Blackwell, 1998.

Soames, S. (1987): "Direct Reference, Propositional Attitudes, and Semantic Content," *Philosophical Topics* 15, 47–87.

——(2010): *What is Meaning?* Princeton, NJ: Princeton UP.

Stalnaker, R. (1984): *Inquiry*. Cambridge, MA: MIT Press.

Steward, H. (1997): *The Ontology of the Mind*. Oxford: Oxford UP.

Stout, G. F. (1952): *God and Nature*. Cambridge: Cambridge UP.

Strawson, P. (1953/4): "Particular and General," *Proceedings of the Aristotelian Society*, reprinted in Schroedinger (ed.) *The Problem of Universals*. Oxford: Humanities Press, 1997, 112–24.

——(1959): *Individuals. An Essay in Descriptive Metaphysics*. London: Methuen.

Taylor, B. and A. P. Hazen (1992): "Flexibly Structured Predication," *Logique et Analyse* 139–40, 375–93.

Thomason, R. (1980): "A Model Theory for Propositional Attitudes," *Linguistics and Philosophy* 4.1, 47–71.

Turner, R. (1989): "Two Issues in the Foundations of Semantic Theory." In G. Chierchia et al. (eds.) *Properties, Types, and Meaning*. Dordrecht: Kluwer.

Twardowski, K. (1912): "Actions and Products. Some Remarks on the Borderline of Psychology, Grammar, and Logic." In J. Brandl and J. Wolenski (eds.) *Kazimierz Twardowski. On Actions, Products, and Other Topics in the Philosophy*. Amsterdam and Atlanta: Rodopi, 1999, 103–32.

Tye, M. (1984): "The Adverbial Approach to Visual Experience," *American Philosophical Quartely* 21.

—— (1989): *The Metaphysics of Mind*. Cambridge: Cambridge UP.

Van de Velde, D. (2001): "Les Structures Nominales Denominatives." In D. Amiot, W. De Cr, and N. Flaux (eds.) *Le Syntagme Nominal, Syntaxe et Sémantique*. Calais: Artois Presses Université, 289–311.

van Geenhoven, V. (1998): *Semantic Incorporation and Indefinite Descriptions*. Stanford, CA: CSLI Publications.

van Inwagen (2000): "Quantification and Fictional Discourse." In A. Everett, and T. Hofweber, (eds.) *Empty Names, Fiction and the Puzzles of Non-Existence*. Stanford, CA: CSLI Publications, 235–47.

Vendler, Z. (1972): *Res Cogitans*. Ithaca, NY: Cornell UP.

Wiggins, D. (1984): "The Sense and Reference of Predicates: A Running Repair to Frege's Doctrine and a Plea for the Copula," *Philosophical Quarterly* 34, 311–28.

Wilkinson, K. (1995): "The Semantics of the Common Noun Kind." In G. Carlson and F. Pelletier (eds.) *The Generic Book*. Chicago, IL: Chicago UP. 383–97.

Williams, D. C. (1953): "On the Elements of Being," *Review of Metaphysics* 7, 3–18.

Williams, E. (1983): "Syntactic and Semantic Categories," *Linguistics and Philosophy* 6, 423–46.

Wolterstorff, N. (1960): "Qualities," *Philosophical Review* 69, reprinted in A. Schroedinger (ed.) *The Problem of Universals*. New Jersey: Humanities Press, 1992.

—— (1970): *On Universals*. Chicago, IL: Chicago UP.

Wright, C. (1983): *Frege's Conception of Numbers as Objects*. Aberdeen: Aberdeen UP.

—— (1998): "Why Frege Does Not Deserve His Grain of Salt: A Note on the Paradox of 'The Concept Horse' and the Ascription of *Bedeutungen* to Predicates." In J. Brandl and P. Sullivan (eds.) *New Essays on the Philosophy of Michael Dummett*, *Grazer Philosophische Studien* 55. Amsterdam: Rodopi.

—— (2007): "On Quantifying into Predicate Position." In M. Potter (ed.) *Mathematical Knowledge*. Oxford: Oxford UP.

Yi, B.-Y. (1999): "Is Two a Property?" *The Journal of Philosophy* 96.4, 163–90.

—— (2005): "The Logic and Meaning of Plurals. Part I," *Journal of Philosophical Logic* 34, 459–506.

—— (2006): "The Logic and Meaning of Plurals. Part II," *Journal of Philosophical Logic* 35, 239–88.

Zamparelli, E. (1998): "A Theory of Kinds, Partitives, and of Possessives." In A. Alexiadou and C. Wilder (eds.) *Possessors, Predicates, and Movement in the Determiner Phrase*. Amsterdam: Benjamins.

—— (2002): "Definite and Bare Kind-Denoting Noun Phrases." In C. Beyssade et al. (eds.) *Romance Languages and Linguistic Theory 2000*. Amsterdam: Benjamins, 305–42.

Ziff, P. (1972): "What is said." In. D. Davidson and G. Harman (eds.) *Semantics of Natural Language*. Dordrecht: Reidel Dordrecht, 709–21.

Zimmermann, E. (1993): "On the Proper Treatment of Opacity in Certain Verbs," *Natural Language Semantics* 1, 149–79.

——(2001): "Unspecificity and Intensionality." In C. Féry and W. Sternefeld (eds.) *Audiatur Vox Sapientae*. Berlin: A Festschrift for Arnim von Stechow. Akademie Verlag, 514–32.

——(2006): "Monotonicity in Opaque Verbs," *Linguistics and Philosophy* 29, 715–61.

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