

REFERENCE TO ABSTRACT OBJECTS IN DISCOURSE

by

NICHOLAS ASHER

*Department of Philosophy and
Center for Cognitive Science,
The University of Texas at Austin, U.S.A.*



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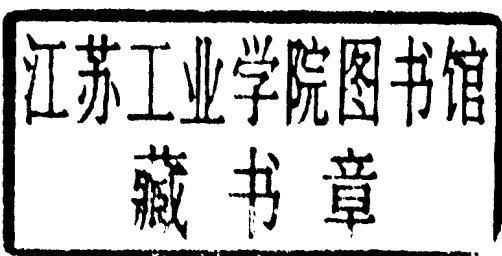
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PREFACE

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INTRODUCTION

This book is about abstract objects and the ways we refer to them in natural language. Abstract objects are things like propositions, properties, states of affairs and facts. They have no spatio-temporal location, usually no causal efficacy, and are not perceived by the senses. They may be universals, like properties, and apply to many concrete objects or they may be particulars. Traditionally, abstract objects have been studied by metaphysicians, logicians and, in particular, ideal-language philosophers.¹ These philosophers' efforts to "regiment" and to systematize the realm of abstract objects have revealed the pitfalls and paradoxes that threaten naive conceptions of these entities, the conceptions exhibited in the ways we ordinarily speak and think about them. But those interested in natural language have also paid a price for this hegemony. The ideal-language philosopher's interest in the natural language semantics of expressions denoting such abstract entities is often much like an inquisitor's interest in the views of a heretic.

While the naive view of abstract entities reflected in natural language remained largely unexplored, linguists and philosophers, inspired by the work of Reichenbach, Davidson, and Vendler, developed a sophisticated understanding of events and states and the expressions that denote them. They developed a typology of such entities, distinguishing between various types of events, as well as states. Following Emmon Bach, I shall call objects that are either some kind of event or states, eventualities. Especially in work on the semantics of tense and aspect, the study of eventualities has flourished.² Davidson's famous paper, "On the Logical Form of Action Sentences," led to the use of eventualities in a general account of adverbial modification.³ Actions, companions to events, have received somewhat less attention in philosophy, but still far more than propositions, facts and states of affairs.

Davidson and others have argued that eventualities, unlike abstract objects, are concrete entities. Nevertheless, eventualities share at least some of the properties that the so called abstract entities have. From the perspective of a naive semantic point of view, eventualities have very close connections to abstract objects like propositions or facts. An assertoric sentence in indicative mood describes, the naive semanticist would say, an event or state. But it also expresses a proposition.⁴ Some might also say that it denotes a fact or describes a state of affairs. Also, anaphoric reference to eventualities is sometimes hard to distinguish from anaphoric reference to facts or propositions. This points to a complex correlation between eventualities and the more abstract entities. The study of purely abstract entities should thus be pursued in tandem with a study of eventualities.

This book offers a particular view of abstract entities and eventualities as we

characterize them in our ordinary speech. I develop a semantic and metaphysical analysis of these entities in two stages. The first reflects faithfully the rich ontology of abstract objects necessitated by the forms of language in which we speak and think. We need such a rich ontology to account satisfactorily for the semantic facts. This first level of analysis portrays what Emmon Bach (1981) has called the "natural language" metaphysics of abstract objects. Natural language metaphysics distinguishes many sorts of abstract objects. But often it fails to provide clear identity conditions or a full analysis. Natural language metaphysics is thus at best a *partial* theory of abstract objects. A second level of analysis maps the ontology of natural language metaphysics onto a sparser domain-- a more systematic realm of abstract objects that are fully analyzed. This second level reflects the commitments of *real* metaphysics. The models for these commitments assign truth conditions to natural language discourse.

A natural place to look for the ontological commitments of natural language concerning abstract objects would be in the semantics of expressions that refer to or denote abstract objects. Such expressions fall into a broad, syntactic class called *nominals*. These nominals may have meanings that are of the same type as the meanings of sentences, nouns, or verbs.⁵ The variety of nominals in English is large and will be examined in chapter one. I will concentrate on *sentential nominals*--those nominals whose meanings are correlated with sentences. From the perspective of the philosophy of language and model-theoretic semantics, the semantics of nominals is full of intriguing puzzles and difficult questions, many of which await exploration. In spite of the fact that formal semantic theories have developed a variety of theories of propositions to handle sententially complemented verbal constructions--chiefly verbs of propositional attitude--very little has been attempted, so far as I am aware, in the way of a systematic, semantic treatment of all the sentential nominals.

The way sentential nominals and other linguistic forms denoting abstract objects interact with various predicates reveals a fundamental distinction between two sorts of denotations--*world immanent* objects like events and states, with causal, temporal and spatial properties, and *purely abstract* objects like propositions and thoughts that do not have causal, temporal, or spatial properties. But there appear to be also intermediate entities, facts, that, like events, have causal efficacy but, like propositions, do not take spatio-temporal modification felicitously. Individuation principles too suggest that facts have an intermediate status between propositions and eventualities. The individuation of propositions depends strongly upon the means we use to describe them; two different descriptions of propositions generally denote two different propositions. Eventualities, on the other hand, can plausibly be assumed to subscribe to principles of individuation that are independent of the means used to describe them.⁶ The individuation principles for facts, like those for propositions, are description dependent, but one appears to refer to the same fact with any two logically equivalent descriptions. These observations suggest that rather than thinking of two completely discrete classes of entities--one world immanent the other not--one should think of a *spectrum* of world immanence. Eventualities and propositions lie at the ends of the spectrum; entities like facts and states of affairs take some sort of an

intermediate position in the spectrum.

A systematic study of nominals, however, does not exhaust those constructions in natural language making reference to abstract entities. This is evident when one includes anaphora within one's purview of the facts to be explained by semantic theory. Anaphoric reference to an abstract object or eventuality differs from anaphoric reference to a concrete individual. Like individual anaphora, abstract object or eventuality anaphora may involve a link between a pronoun and a nominal or a noun phrase, as in *John came home and he was tired* (where we anaphorically refer to John with the pronoun *he*) or as in *The murder took place in a dark alley, and no one witnessed it* (where we anaphorically refer to the murder with the pronoun *it*). But abstract object anaphora and eventuality anaphora also commonly occur when no coreferential noun phrase or nominal is present. Consider, for instance, the following examples culled from *The Wall Street Journal*. (The anaphors are in boldface.)⁷

- (1) Be careful what you wish. . . because wishes sometimes come true. **That's** what the Semiconductor Industry Association, which represents U.S. manufacturers, has been learning.
- (2) Well, a clerk told us, we'd need to hire a lawyer to make a petition--but it probably wouldn't be worth the effort. . . .
- (3) Being spanked by Milton Friedman is one of life's most humiliating experiences (see alongside), so we feel compelled to fess up about when we'll proclaim the "right" price for ice-cream cones. We faithfully promise to do **that** on the day Milton Friedman proclaims the "right" percentage for annual growth in the ice-cream cone supply.
- (4) As part of corporate streamlining programs, many companies are extending early-retirement packages to legions of senior managers. They see **it** as one relatively painless way to pare management ranks. . . .
- (5) But "Misery," which runs its mostly gripping if unattractive course in one little bedroom with only two real characters, is selling like mad. **It** just goes to show you that some people don't know when they've been insulted.

The anaphors *it* and *that* in these examples refer back to a proposition in (1), a property or type of action in (2) and (3), a type of event in (4), and a fact in (5). But none of these entities is referred to by a nominal as ordinarily understood. Rather, the semantic processing of clauses, verb phrases, whole sentences, or even whole discourses furnishes antecedents to pronouns in these examples. A semantic investigation of abstract entities in natural language must explain how such syntactic structures introduce the abstract entities to which pronouns such as those in (1) - (5) apparently refer.

The investigation of abstract entity anaphora not involving nominal antecedents highlights a difficulty not found with individual anaphora. An example like (1) indicates that a sentence, a clause, or indeed a sequence of sentences may furnish antecedents in abstract entity anaphora. But other examples just as clearly show that certain sequences of sentences or clauses *cannot* furnish antecedents. Which

sequences are available and which are not depends on the way the various bits of text contribute to a coherent whole. Many authors have noted that a large discourse falls naturally into various segments; it appears that some segments of discourse but not others support abstract entity anaphora. An analysis of abstract entity anaphora thus requires a theory of the propositional structure of a discourse. Research has discovered a number of parameters that affect discourse segmentation. These include the genre of the discourse, the use of tense and aspect, the use of certain "discourse particles" like contrastives (*but, however*) and words like *too, also*; various clue words about the structure of arguments or task instructions in the discourse, and assuredly world knowledge about the subject matter of the discourse. But to date there has been no theory of discourse structure which is precise enough to give the appropriate predictions concerning abstract entity anaphora.

The main purpose and major contribution of my study of abstract entities and eventualities in natural language is to develop a systematic semantics for expressions that denote or characterize them and to integrate this semantics with an account of discourse structure to analyze abstract entity anaphora. But to accomplish this task, I will first have to answer several questions. The first arises from work begun by Vendler on the typology of abstract entities: How many different sorts of abstract entities and eventualities manifest themselves in our use of natural language? Data about distributional differences and predicate incompatibilities are important in such an investigation. But so are examples concerning anaphora. The rationale for this relies on a broadly Quinean approach to discovering the commitments of natural language metaphysics. In "Existence and Quantification," Quine argued that to be was to be the value of an existentially bound variable. If we construe anaphora, roughly, as a matter of binding the variable introduced by the pronoun by the quantifier introduced by its antecedent, then abstract entity anaphora ought to be another place in which to discover the ontological commitments of natural language.

The typology of objects will be an important component in constructing the semantics of nominals. The semantics of nominals in turn is one foundation for a semantic account of anaphora involving reference to abstract objects. The other foundation is a theory of discourse structure. Indeed, the analysis of abstract object anaphora provides a novel way to approach the segmentation of discourse into a structure of related propositions. It puts constraints on theories of discourse segmentation, constraints which research in this area has so far not exploited. My semantics for abstract objects and the basic analysis of anaphora will provide a formal framework within which to specify, formalize, and compare various proposals about discourse structure and the process of discourse segmentation. I will define the process of discourse at the level of abstract objects. Thus, discourse segments will be taken to be propositions; and propositions will be terms of discourse relations. Discourse relations will determine a propositional structure for a discourse, while propositional constituents of this structure will function as the referents for pronouns in anaphoric connections that involve discourse segments as linguistic antecedents. This analysis of nominals and this account of discourse structure will yield a theory of abstract entity anaphora. It will present a uniform analysis of the sorts of anaphora

exemplified in (1)-(5). I will also show how the theory applies to other anaphora-like phenomena like verb phrase ellipsis in which there are no overt anaphoric pronouns.

This technical work on semantics and discourse structure has philosophical implications. What does the panoply of abstract entities to which the forms of natural language commit us amount to as a metaphysical theory? I believe we are committed to two things. The first is that natural language users subscribe to a very rich ontology of abstract objects and eventualities. There are many diverse sorts of abstract objects and eventualities along the scale of world immanence in natural language metaphysics. The plethora of ontological types in natural language metaphysics is computationally efficient in much the same way that typing in computer languages is: type-checking allows natural language users to find anaphoric antecedents for pronouns that refer to some sort of abstract entity more efficiently, and it also enables us to check quickly the coherence of statements about abstract objects, whose verification is in general uncertain and difficult. But the typing of abstract objects in natural language is also fluid in a way that is unfamiliar to the domain of concrete individuals, which includes things like rocks, trees, cats and people. Some sentential nominals may refer to different types of abstract objects with intuitively the same content. Also, abstract entity anaphora may involve an antecedent denoting an abstract object of one type while the pronoun denotes an object, with intuitively the same content, of a different, incompatible type. This suggests an interesting and complex sort of context-sensitive, polymorphic typing at work in natural language.

My second contention is that these entities are conceptual constructions, made by recipients for the purpose of the efficient processing of natural language discourse. There are in fact two different theories of abstract objects. The goal of natural language metaphysics is to uncover and describe the various commitments that are ingrained in the forms of language in which we speak and think. These commitments need not coincide with what one takes to be the ultimate constituents of the world, the subject of "true" metaphysics. The types of natural language metaphysics need not carry over into ontological commitments at the level of "real" metaphysics. One may speak for purposes of convenience as if one believed in the mind-independent existence of a wide variety of abstract objects without really being committed to the ontology suggested by our forms of language.

What might be a philosophical argument for this conceptualist view? Two Quinean slogans, whose truth is nevertheless grounded in the ways we think about truth in a model and hence semantics, furnish the beginnings. The first we have already used: to be is to be the value of a bound variable. This apparently commits us to all sorts of abstract objects, if we pay serious attention to the way we speak. On the other hand, many metaphysicians have justifiably believed the slogan: "No entity without identity." That is, if one cannot supply a principle of individuation for a certain type of entity, then one ought not to admit such a type into one's metaphysics. If the first slogan commits us to a wide number of objects, the second slogan gets us into immediate difficulties. There are ordinary examples of eventualities and abstract objects like propositions and facts and uses of such that defy all the proposed individuation principles. Many people who have no difficulty with the thought that

the world is populated with concrete individuals thus find the idea of such entities as propositions, facts, and even events troublesome.

Many events, for instance, have a spatio-temporal location. For many others, however, for instance the event of the Polish economy's collapse, the question of their spatiotemporal location is problematic. So the criterion of individuation of events proposed by Lemmon (1967) and Quine (1962)--namely that any events with the same spatio-temporal location are identical--is quite problematic. On the other hand, criteria of individuation like Kim's (1966) that exploit a notion of properties--e.g., events instantiating the same property are identical--often seem too strict. If Fred traveled from Austin, Texas, to San Jose, California, by walking, and he only traveled once from Austin to San Jose, we would like to say that the event of his journey was the event of his walking, even though according to Kim these two events would appear to instantiate different properties.

A deeper problem lurks here, however. It seems that even the question of the individuation of eventualities is a wrongheaded one. We spend a great deal of our cognitive life recognizing particular objects; we are amused by puzzles arising from mistaken identities of individuals like those in Shakespeare's *Twelfth Night* and Mozart's *Le Nozze di Figaro*. We also spend much of our cognitive life recognizing certain situations--dangerous ones so that we can avoid them, pleasant ones so that we can be part of them or prolong them. These situations might correspond to types of events. In law courts, we sometimes spend a great deal of time trying to determine whether an event of some type took place or not. But we don't spend much of our cognitive life recognizing particular events or worrying, outside of philosophical contexts, whether two events are identical or not. So perhaps we do not have any unique, context-independent criterion of individuation for such objects at the level of natural language metaphysics. At best, it seems that we individuate events sometimes by appealing to their descriptions, in other cases by appealing to their spatio-temporal location.

The problems of individuation are much worse with any intuitive notion of proposition or thoughts. The philosophy of language has tried for many years to give an answer to the question, "How are propositions individuated?" For with such an answer, one could--so everyone hoped and many still hope--solve the puzzles about the semantics of attitudes and attitude reports. Yet the answers to the question of propositional identity that presuppose that the question has a definite answer are all unsatisfactory. At best, one can hope for a context-relative notion of individuation of a proposition--a notion, that is, on which what a proposition or thought is depends on who is doing the thinking or the entertaining of the proposition and also what communicative purpose this proposition is used for, a claim that I have argued for at length elsewhere.⁸ Of course, one might object that the identity of concrete objects is also a complex matter; there are problems of split brains, cloning, and *Star Trek* transporters to consider. But for either eventualities or abstract objects like propositions, it seems dubious that there are clear principles of individuation that handle even the mundane everyday cases. This indicates that from a metaphysician's point of view, we do not have well-defined types of objects corresponding to

eventualities or propositions, and most likely other sorts of abstract objects as well.

One may thus well have qualms about admitting entities like events or states into our true metaphysical universe. Or if such entities are admitted into the categories of real metaphysics, one may want to require a strict theoretical reconstruction that eliminates these apparent categories in favor of others. Nevertheless, we may find, as indeed appears to be the case with events, that such entities are useful, perhaps even essential, to postulate for the understanding of natural language. After all, we make constant reference to them. They also figure crucially in our causal talk about the world. Similarly unavoidable appear to be references to properties, concepts, propositions and perhaps also facts and state of affairs. All these abstract entities are distinct pieces of the baggage of natural language metaphysics. I will thus postulate such types at the level of natural language metaphysics and simply stipulate them to be distinct. But natural language metaphysics differs from real metaphysics, in that it provides no individuation principles. Eventualities, propositions, and other abstract entities are postulated in such a metaphysics as "discourse entities"--demanded by the forms in which we speak. But these discourse entities may turn out to be identified or distinguished, depending on the way the discourse is semantically interpreted and assigned a truth value. The process of interpretation translates natural language metaphysics commitments into real metaphysics. Individuation principles are in effect specified when the domains of natural language metaphysics are mapped onto the domain of real metaphysics. The division between natural language metaphysics and real metaphysics as I have set it up is ideal for making sense of context sensitive principles of individuation. Two events for instance postulated at the level of natural language metaphysics may be identified at the level of real metaphysics if the context is one in which it is appropriate to use one criterion of individuation, while in another context--calling for another principle of individuation--they may remain distinct. Thus, a principle of individuation for a given type in a particular context in effect specifies a partition of the extension of the type relative to that context.

But the distinction between natural language and real metaphysics also allows us to simplify the scheme of metaphysical types when we move to real metaphysics. Distinct types at the level of natural language metaphysics may of course disappear under such a mapping. It appears possible, for instance, to map a domain of events in the natural language metaphysics into an eventless universe at the level of real metaphysics. While I shall end up allowing eventualities an independent, irreducible existence at the level of real metaphysics, I shall end up eliminating facts, propositions, and states of affairs as independent sorts of entities.⁹ To capture some relevant linguistic facts, however, these types must be distinguished at the level of natural language metaphysics.

Let us look at an interesting case familiar to linguists and computational linguists in which we need to distinguish between two types of eventualities at the level of natural language metaphysics but cannot do so at the level of real metaphysics. Many linguists and philosophers¹⁰ have distinguished between states and events, or activities and accomplishments. Events have often been described as "punctual" or as "containing their initial and final, temporal endpoints," while states and activities have

been described as "open-ended" or "not containing their initial and final, temporal endpoints."¹¹ These distinctions between eventualities help make sense of the way adverbials combine with various verb forms and tenses in other clauses, and they delineate ontological categories at the level of natural language metaphysics.

Most of those who countenance the existence of such categories of eventualities would say that in sentence (6) a state of Peter's is being described. This state forms the background for a description of the event of Mary's coming home and finding her easy chair.

(6) Mary walked in the door. Peter was doing the washing up. She kissed him and then sank into her easy chair. It had been a hard day.

But the *very same real world event* might also be described as an accomplishment. For instance, many linguists and philosophers would so recognize the event described in (7):

(7) Peter washed the dishes.

If we do not distinguish between real world and natural language metaphysics, our judgments concerning (6) and (7) lead to trouble, since (6) and (7) may both be true of a single physical event. Then we seem to be saying that one object may be both a state and an event (or an accomplishment and an activity), while maintaining that these types are distinct with incompatible criteria of application. If we separate natural language metaphysics from real metaphysics and allow that the types of objects postulated in natural language metaphysics may not correspond to distinct types in real metaphysics, this sort of puzzle evaporates. There are distinct notions and categories of eventualities at the levels of real metaphysics and natural language metaphysics.

By postulating two levels of analysis, I can be a profligate platonist insofar as natural language metaphysics is concerned as seems to be required, and a conceptualist about abstract entities at the level of real metaphysics. Thus, while propositions are first class citizens of natural language metaphysics, they are really artifacts--objects that we, as intelligent agents, construct and manipulate for the purpose of communicating and thinking about our own intelligent behavior. Propositions don't have any independent existence or purpose outside of these communicative purposes or these reflections. As mental constructs, propositions and other abstract entities organize and help codify our experience and render it intelligible to us. But without the existence of minds, there are neither propositions nor concepts. Language, together with the assumption that human minds process it similarly, ensures communication concerning these abstract objects. It is in the process of interpreting and using language that concepts, propositions and the like are created.

To establish the distinction between natural language and real metaphysics requires a particular framework. I have chosen Discourse Representation Theory (DRT) for several reasons. First, a central part of my project involves an analysis of

anaphora. DRT has a general, successful approach to discourse anaphora which appears broad enough to provide a unified treatment of anaphoric reference to individuals, groups or plural entities, events, states, and abstract objects. Using DRT will enable me to make comparisons between anaphoric reference to concrete individuals, which is relatively well understood in DRT; plural anaphora, which has been studied to some extent in DRT; and abstract object anaphora, which remains largely virgin territory.

Second, the DR-theoretic framework has a context sensitive notion of meaning and a highly structured notion of context, both of which are crucial to my conception of propositions and to the propositional structure of discourse. Many traditional theories of propositions presuppose a functional relation between sentences of a language and propositions; every well-formed sentence expresses a unique proposition. Traditional theories develop two general views of propositions. The Russellian tradition, developed in modern times by Russell, Bergmann, and the school of "Midwestern Realism,"¹² takes propositions to be structured entities whose constituents are individuals and relations, plus perhaps some logical operations. The Fregean tradition divides into two camps; the first develops the view of propositions as sets of possible worlds (for which Montague (1963) is chiefly responsible), while the second develops a structured view of propositions composed from primitive abstract senses (Church's logics of sense and denotation). There are also more sophisticated theories in each of these traditions that incorporate contextual elements like those advocated by Kaplan (1977); such theories define a proposition relative to a sentence uttered in a particular context. A functional dependence of propositions on sentences and contexts used to supply denotations for indexicals and demonstratives characterizes these views.¹³

Considerations like those mentioned above about proposition anaphora, however, cast doubt on simple hypotheses about the nature of propositions. The proposition expressed by a sentence *S* depends in general on the structure as well as content of the discourse of which *S* is part. Kaplan-like contexts do not capture this contextual dependency. Another complication comes from the analysis of the attitudes, which are commonly taken to be relations between agents and propositions. An agent's attitudes may hang together in a such way that a sentence will express one of those attitude objects only given an appropriate background setting describing other beliefs and attitudes of the agent's. The simple functional relation between propositions and sentences (plus Kaplan-like contexts) breaks down in this case too. Such difficulties become much more severe, once we try to account for the way the content of a sentence contributes to the propositional structure of an overall discourse--or what some have called the *discourse structure*. The functional relation between propositions and sentences seems totally inadequate in trying to describe this notion. Yet a correct understanding of discourse structure, I will argue, is crucial to understanding abstract entity anaphora. I thus conclude that a traditional framework will not do for an adequate analysis of abstract objects like propositions in natural language metaphysics.

Unlike traditional semantic theories, the unit of meaning for DRT is not the