Elementary sentences containing 'be':
a semantic analysis of subject-predicate relations

by

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ABSTRACT

Within a theoretical framework that combines generative X-bar syntax (Chomsky 1986), a compositional interpretive semantics and elements of Aristotelian logic, this thesis studies the nature of the syntactic and semantic constituents involved in the subject-predicate relations of elementary sentences containing 'be'. Interpretation is characterized in terms of the entities of various types that speakers intend to refer to and the various ontological types that the referents are said to belong to. 'Be' is analyzed as a single lexical item. This analysis unifies all syntactic functions (e.g., auxiliary, copula, main verb) and all "senses" of 'be' (e.g., definitional, equative, predicative, etc.). Conceptually, 'be' in English is an explicit sign of attribution. The propositional content of simple sentences of the form [NP be XP] is the attribution of a certain ontological type or types to the referent(s) of the subject NP. Although the value of postulating a single ontological category to account for all the entities that speakers can refer to and talk about (such as an Aristotelian substance) is questionable, nevertheless, such categories and types seem pertinent for linguistic analysis. With respect to linguistic inference, pronominalization, and question words, an analysis based on ontological types is shown to be more explanatory than one based on the assignment of a fixed set of thematic relations to arguments.

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RÉSUMÉ

Cette thèse étudie la nature des constituents syntaxiques et sémantiques que comportent les relations "sujet-prédicat" des phrases simples de la forme [SN be SX]. Le cadre théorique combine la théorie de la syntaxe X-bar (Chomsky 1986), une sémantique interprétative compositionnelle et des éléments de la logique d'Aristote. Les dénotations des expressions composées sont caractérisées en termes des entités de toutes sortes dont on peut parler et aussi en termes des types ontologiques auxquels ils appartiennent. Le verbe 'be' est considéré comme une seule unité lexicale. Cette analyse s'applique à l'unification de toutes les fonctions syntaxiques (e.g., auxiliaire, copule, verbe principal) et de tous les significations de 'be' (e.g., de définition, d'équation, d'attribution, etc.) 'Be' en anglais est un signe explicite d'attribution. Toutes les phrases simples qui emploient 'be' expriment l'attribution d'un certain type ou de types ontologiques aux référents des SN qui fonctionnent comme sujets. Quoique l'idée que les référents des sujets appartiennent à une seule catégorie ontologique telle que la substance d'Aristote soit discutable, les catégories qu'il identifie sont néanmoins pertinentes pour l'analyse linguistique. Selon les données relatives à la pronominalisation, aux mots interrogatifs et aux implications entre les phrases, une analyse ontologique est plus explicative qu'une analyse fondée sur la distribution d'un ensemble fixe de relations thématiques.

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Introduction

In this dissertation I will investigate the semantics of a basic fragment of English: elementary sentences containing the verb 'be'. For the present, let us assume informally that semantics involves the interpretation of sentences and the traditional notions of *sense* and *reference* (These notions will be clarified in Chapter 1.) As a contribution towards a compositional interpretive semantics of English within generative grammar, my objective here is to propose an analysis that may serve as a basis for explaining how competent speakers of English can interpret simple sentences of the following types.

1 (a) This is Steph.

(b) Steph was my tennis partner.

My tennis partner was Steph.

(c) She is a chef.

(d) Many chefs are fat.

(e) The recipes were in the file.

(f) The spices are arranged in alphabetical order.

(g) A chef is hitting the dishwasher.

(h) Someone is being gluttonous.

(i) All of the knives are being sharpened.

This investigation will focus on the semantic relation that obtains when subject and predicate phrases, as traditionally analyzed, combine to form elementary sentences. In the sentences above, the subject phrases all contain either a proper name, a pronominal or a common count noun, and the predicate phrases all contain a form of 'be', which is underlined. The different sentence types containing 'be' are often treated as syntactically and semantically different. As a consequence, 'be' itself is analyzed as syntactically and semantically different. It is sometimes claimed that there is more than one lexical item 'be' in English (e.g., Rothstein 1983; Williams 1984). However, such an analysis fails to

capture certain morphosyntactic and semantic generalizations concerning the verb that appears in all of the sentences in 1. I shall maintain in this work that the different forms and uses of 'be' in the sentences above are not totally unrelated to each other, but rather belong to a single lexical item 'be'.

The theoretical framework of the investigation is generative grammar, which is fundamentally conceived as (part of) a theory of mind. In this framework, language is taken to reflect the structure of the mind, and reciprocally, the principles of "sentence grammar" are taken as principles governing the organization of thought. According to Chomsky (e.g., 1975, 1977, 1981, etc.), the goal of generative "grammar is to express the association between representations of form and representations of meaning." (Chomsky 1981: 17). In this investigation, I will adopt certain assumptions underlying the position taken by Jackendoff (1983) which are compatible with and in fact are the logical consequences of Chomsky's mentalist theory of language. For instance, Jackendoff imposes a *"Cognitive constraint"* on semantic theory and hypothesizes the following: "There is a *single* level of mental representation, *conceptual structure,* at which linguistic, sensory, and motor information are compatible." (Jackendoff (1983: 17). Although he considers the domain of semantics to be the general conceptual structures of the mind, he nevertheless imposes a *"Grammatical Constraint"* on semantic theory. According to this constraint, the mapping between syntactic form and meaning should be as systematic as possible. In fact, "one should prefer a semantic theory that explains otherwise arbitrary generalizations about the syntax and the lexicon." (Jackendoff 1983: 13). Specifically, for Jackendoff, semantics studies the structure of the information contained in the thoughts that are conveyed by sentences of language and he assumes "that language is a relatively efficient and accurate encoding of the information it conveys." (1983: 14).

Now although my problem concerns the <u>interpretation</u> of sentences containing 'be', like Jackendoff, I do not attempt to describe the nature of the processing by which speakers interpret these sentences, but rather the underlying syntactic and semantic information, i.e., the structural and conceptual information, that speakers must use as a basis for interpreting these sentence types. In this dissertation, I shall focus specifically on the information supplied by the linguistic system and

conceptual structures In analyzing the subject-predicate relations of elementary sentences, I will address the following questions

(i) What are the basic units of syntactic structure contained in the sentence types in (1)?

(ii) What are the basic units of conceptual structure that correspond to the structural units in (1)?

(iii) How are the units of syntactic structure and the units of conceptual structure correlated with each other and constrained?

According to generative grammar, both structural and conceptual information are essential for semantic interpretation, but neither is sufficient on its own As a basis for judging the truth of a sentence, speakers have to analyze the sentence structurally (according to the principles of sentence grammar) and know the sense and reference of the lexical items it contains If we conceive of the grammar of a language as a system which correlates sound and meaning, then syntax may be seen as the principal means by which the link is established Thus, a systematic investigation of the semantics of elementary sentences containing 'be' must be grounded on a prior syntactic analysis

Syntactic analysis. The system of syntactic analysis that I will apply here makes use of the fundamental distinction between *unit* and *relation* From this perspective, grammatical subjects and predicates are analyzed as relations between categorial units of structure, as described by Chomsky (1965: ch. 2; 1986). For English sentences, the notions of *subject* and *predicate* are defined in terms of configurational structures. To begin with, it is necessary to determine the basic syntactic units and configurations that will support my semantic analysis of elementary sentences containing 'be'. If a sentence is the maximal projection of the properties of INFL ("inflection"), then elementary sentences may be characterized according to current X-bar syntax (e.g., Chomsky 1986) as simple sentences containing only one clause (I" or IP). An elementary sentence contains one (and only one) phrase (N" or NP) that functions as the grammatical subject and one (and only one) phrase (V" or VP) that functions as the grammatical predicate of the sentence. Configurationally, the NP and

VP in question are immediately dominated by a projection of INFL in hierarchical phrase markers such as the following

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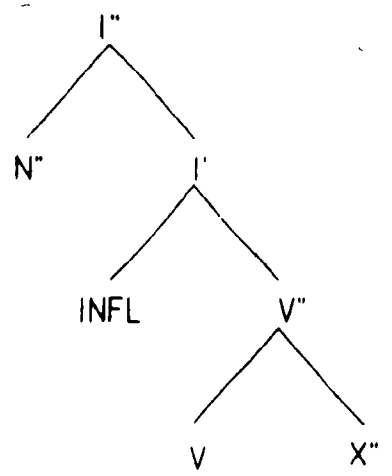

An elementary declarative sentence (a predication) is formed by the combination of a subject phrase and a predicate phrase If well formed semantically, it expresses a proposition [1] Thus, it may be used by speakers to make a claim concerning certain states of affairs As the potential bearer of truth values, a proposition is expressible only by a formally complete sentence, i e , one that meets the minimal necessary morphosyntactic well-formedness conditions specified by the sentence grammar A syntactically well formed elementary sentence will thus be analyzed minimally as [$_{I"}$ NP [$_{I'}$ INFL VP]] [2]

But is the analysis represented in 2 above adequate to account for the structure of the sentences in 1? In particular, where would 'be' itself fit into the phrase marker in 2? One question

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[1] Semantic well-formedness must be explicated in terms of conceptual structures. See Bradley and Swartz (1979: ch. 2) for a characterization of the entities that are called "propositions" here. They argue that propositions are *sui generis;* they are abstract entities in their own right, like numbers, sets, classes, sentence types, etc. Propositions are, for them, "the bearers of truth and falsity." (Bradley and Swartz 1979: 84-85; see also Katz 1972: ch. 4; Nuchelmans 1980: ch. 8, cf. Cartwright 1966).

[2] The node I" corresponds to S in the Extended Standard Theory, N" to NP, V" to VP, and so on. In *Aspects,* the notions of *subject* and *predicate* are defined as the configurations [NP,S] and [VP,S], respectively (Chomsky 1965: 71). The maximal projection of C (Complementizer) which is required for wh-sentences and embedded clauses will be omitted in this study when it is irrelevant, as in 2 above.

that is often debated in linguistics is the syntactic category or categories of 'be'. For instance, for sentences 1 (h)-(i) above, many linguists would make a distinction between 'is'/'are' (analyzed as an auxiliary (Aux)) and 'being' (analyzed as a verb (V)). (See, e.g., Akmajian and Wasow 1975, Williams 1984.) A primary descriptive task of this investigation will thus be to determine the syntactic category of 'be' in its various forms. I shall argue that 'be' is a full verb which takes an obligatory complement of category X" or XP, as illustrated in 3.

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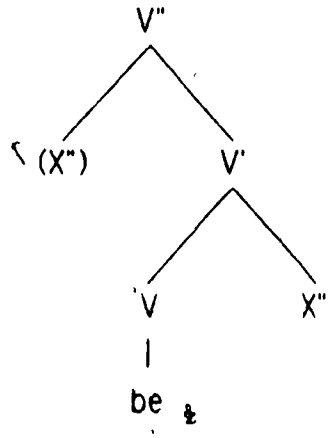

Here X of X" or XP may be a noun (N) (as in 1 (a)-(c)), an adjective (A) (as in 1 (d)), a preposition (P) (as in 1 (e)), or another V (as in 1(f)-(i)). A further task is to complete the syntactic description of elementary sentences containing 'be'. Only a detailed analysis of the internal structure of the phrases that function as the subject and predicate of these sentence types can serve as a basis for a systematic analysis of the subject and predicate functions and the semantic relation of predication.

Semantic analysis. The second question in my semantic investigation involves the basic units of semantic structure. Here, as reviewed by Jackendoff (1983: 11), the criteria of expressiveness and universality apply as constraints on semantic theory. "A theory of semantic structure ... must be able to express all the semantic distinctions made by a natural language." Without conducting a cross-language inquiry to determine possible universal concepts, the key exercise is to ascertain in a general way what kinds of things it is that speakers can talk about and what kinds of things can be said about them. This type of inquiry leads naturally to the unending philosophical debate concerning the relationship between language, mind and reality. In connection

with this, the semantic analysis of sentences containing 'be' that I will propose here basically follows an Aristotelian approach in some respects.

During the 4th century BC, the Greek philosopher Aristotle developed a logical system specifically to symbolize the internal subject-predicate structure of copular sentences in ancient Greek. Aristotle's logical system, which was later developed by the Stoics and extended by Leibniz, is known as traditional formal logic (TFL). My interpretive analysis incorporates some of the principles of TFL, especially as interpreted and developed by Sommers (in 1982, and in earlier works on semantic types and ontology). Some Aristotelian scholars (e.g., Sommers 1982) still claim that elementary sentences containing 'be' express the most fundamental propositions, i.e., "categorical" ones. From sentences such as those in 1, one may learn various kinds of basic facts, e.g., what someone or something is (or what it is called), what kind of thing it is, where it is located, what it is doing, etc. Categorical propositions are said to reflect a categorization scheme, i.e., a scheme of ontological concepts by which human beings organize and understand their experience in the world. Aristotle proposed a theory of categories, containing a list of universal types for the classification of these ontological concepts. The intriguing question concerning this scheme of categorization is whether it belongs basically to language, to the mind, or to reality. Following Frede (1981), I adopt the notion, implied by Aristotle, that it belongs to all of the above at the same time. But the most important question here is the significance of this categorization scheme for linguistic description and explanation.

On the model of TFL, a sentence consisting of the surface sequence [NP be XP] is said to contain two terms, each belonging to one of Aristotle's categories. Or to put it another way, the phrases that function as the subject and the predicate complement of 'be' may be used to refer to entities that belong to one ontological category or another. Categorematic expressions denote entities that belong to particular ontological types which may be classified according to Aristotle's categories. In TFL, 'be' is regarded as a syncategorematic expression that relates two categorematic phrases. An affirmative declarative sentence of the form [NP be XP] states that the referent of the subject belongs to a certain

type or types denoted by the predicate term.[3] The following exhibits the syntactic units of an elementary sentence containing 'be' and the corresponding conceptual analysis that I propose.

4	'A'	is	B'
Syntax:	[NP	be	XP]
Concepts:	Referent(s)	belong to	type(s)

The rule of interpretation that I propose for all declarative sentences containing 'be' accounts for the relations between terms which can hold in view of their intensions. I assume and will use an extensional theory of semantics in this work. Such a theory is concerned with the relations between linguistic expressions and any extralinguistic phenomena that speakers may refer to when they use these expressions. The conceptual analysis proposed above suggests certain semantic well-formedness conditions for sentences containing 'be'. For instance, 'B' must be "predicable" of whatever is denoted by 'A'. And if the statement 'A is B' is true, then in a valid logical argument the expression 'B' is semantically substitutable for 'A'. (Sommers (1982: chs. 6, 13) traces similar ideas to an Aristotelian principle known as the "*dictum de omni*.")

As for the meaning of the lexical item 'be', this is by no means the first time the question has been studied. 'Be' and sentences containing 'be' (or its equivalents in other languages) have been the subjects of much research and also of long-standing controversies among linguists, philosophers and logicians, at least since Plato and Aristotle. Various positions concerning the meaning of 'be' include, among others, that (i) 'be' is univocal or as Plato would say, it has one "definition" that would cover all its different uses (e.g., Kahn 1973); (ii) 'be' is decidedly equivocal or ambiguous (e.g., Russell 1920); (iii) if 'be' is ambiguous, it is systematically so; it has one focal meaning to which all others are related (e.g., Aristotle *Metaphysics* 4, 2; Owen 1960); (iv) 'be' in itself is meaningless (e.g.,

[3]The notion of *belonging* that I propose here as the conceptual analysis of 'be' is more general than the primitive (undefined) concept that is symbolized '∈' in set theory. The latter is a relation between elements and sets (Halmos 1960: 2). The relation I describe is not limited to elements that belong to sets. Indeed if a referent x belongs to the type denoted by 'A', then it is contained in type A, but 'A' need not be a count noun, although it must be quantifiable in some way to be referential. For details, see Chapter 3.

Lyons 1968; 1977). Owing to this complication, another important descriptive task of this dissertation is to support the conceptual analysis that I proposed above. Reformulated in terms of the generative lexicon, the key questions are: How many classes of 'be' are there in the synchronic lexicon of English? or, How many lexical entries for 'be' are required for an adequate semantic description of sentences containing the various forms of 'be'? Although exactly how many 'be's there are is clearly an interesting question, the basic problem is to determine which factors or principles could be used to answer it.

In any case, I shall argue that 'be' is univocal. When one examines the different semantic analyses that are actually proposed, it becomes clear that the different senses that are ascribed to 'be' are primarily the effect of the conceptual content of the phrases that function as its subjects and predicate complements, rather than there being different classes of 'be'. The problem may result from the failure to recognize the syncategorematic aspects of 'be'. 'Be' on its own signifies the conceptual relation of *belonging to* (a type), but the type of being is designated by a complement phrase that belongs to an ontological category

One advantage of a TFL-based categorical analysis of elementary sentences containing 'be' over one based on other systems of analysis stems from the following. TFL does not need to distinguish between subject phrases and predicate complement phrases on the basis of semantic criteria (Sommers 1982: 41). Rather, it seems that a particular categorical phrase (NP or XP) would always correspond to the same ontological category or type, regardless of its grammatical function in categorical sentences. In many other analyses, a distinction is made between the semantic functions of subject and predicate complement. According to the assumptions of the Western structuralist tradition in linguistics, the grammatical subject is the expression (phrase) that is employed by the speaker to identify a referent or referents and the grammatical predicate is the expression (phrase) that is used to say something about the referent(s) (Lyons 1977: ch. 12, 470, 501). Thus, the subject is said to

function as an "identifying phrase" and the predicate complement as the "attributive phrase."[4] For example, the expressions 'she' and 'is a chef' function respectively as the grammatical subject and predicate of sentence 1 (c). The thing or person being talked about is an individual designated by 'she' Let us assume that 'she' is used in sentence 1 (c) to refer to Steph. If so, the property of being a chef is attributed to the referent of 'Steph'. Generalizing then, according to this analysis, the propositional content of a declarative sentence containing 'be' is the attribution of a property to an individual or to a class of individuals.

For pragmatic analysis, the traditional account of the semantic functions of the subject and predicate phrases and the predicative relation (i.e., the attribution of a property to an individual) seems intuitively correct. In conceptual terms, however, it is surely questionable that the same analysis could be extended in a natural way to all of the sentence types illustrated in 1 above (to say nothing of the types of sentences containing 'be' that are not illustrated here, e.g., existential ones.) Considering only those types illustrated in 1, sentences such as 1 (b), for example, are often analyzed as "equative" and sentences such as 1 (e) are taken to illustrate the attribution of a "location" to some objects (Lyons 1977: 469-481). These sentence types have linguistic characteristics of their own, e.g., the reversability of the subject and predicate complement phrases (as illustrated by the sentences in 1 (b)). Lyons makes the point that speakers may attribute things other than properties to

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[4] If the distinction between "identifying phrase" and "attributive phrase" were valid, then we should have to determine what the source of the distinction might be. A reasonable answer is that it is the structure of the sentence. But the distinction is sometimes expounded in terms of (i) the denotative function or (ii) the referentiality of the expressions employed. Compare, e.g., 'a chef' in 1 (c) and 1 (g) above.

(i) For logicians working in the framework of modern predicate logic (MPL), the subject of an atomic sentence denotes a "particular" while the predicate designates a "general concept." (See, e.g., Quine 1960; Strawson 1974).

(ii) Jackendoff (1983: 78) makes a type-token distinction between the conceptual structures that correspond to the expressions that typically function as subject (token) and predicate complement (type). For discussion, see 1.3.1. Other linguists implicitly deny that there is a semantic distinction between expressions that function as subjects and predicate complements of 'be', at least in terms of "referentiality." That such expressions are coreferential is implied in the analysis of predication by coindexing. For discussion, see 2.1.1.

individuals.[5] Strictly speaking, neither sentence type (1 (b) or 1 (e)) would be taken to express the attribution of a property to an individual or to a class of individuals. But also, by the same token, speakers may talk about things other than individuals or sets of individuals; those denoted by non-count nouns, e g , 'water', 'sincerity', etc. (The sentences in 1 contain only count nouns or pronominals)

For the sake of descriptive elegance, I shall prefer an analysis which makes no a priori semantic distinction on the basis of grammatical functions or relations. In fact, the semantic analysis that I propose for elementary sentences containing 'be' parallels the syntactic analysis. This analysis requires a semantic distinction that is analogous to the distinction made between units of structure and the relations between these units. I would argue that in fact a general specification of the functions of the subject and predicate phrases is not a primary step in the semantic analysis of elementary sentences. Rather the corresponding semantic relations are derived on the basis of a structural analysis, as Chomsky (1965) argues concerning grammatical relations, and on the basis of lexical choice. The generalizations that are significant for the semantic analysis of subject and predicate complement phrases should be stated in terms of units of conceptual structure, rather than semantic relations (or thematic relations), if our syntax and semantics are to be consistent. This leads to the third question to be addressed in this dissertation.

Form-meaning correlation. How are the units of syntactic structure and the units of conceptual structure correlated with each other and constrained? I assume, with Jackendoff (and many other generative grammarians), that the mapping between syntactic and semantic structures is effected by grammatical "correspondence rules" (Jackendoff 1983: 13-16). Such mappings are constrained by two guiding principles: the grammatical constraint and the principle of compositionality, which together would lead one to prefer the simplest, most direct, but also complete mapping between units of syntactic form and units of conceptual structure For a single sentence, the

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[5] This criticism may be based on too literal an interpretation of the semantic term 'property', i.e., if Lyons has in mind the intensional construct proposed by Carnap (1956), among others.

mapping depends in part on the lexical representation of the main verb. In this respect the methodology, theoretical framework and goal of my inquiry are quite close to those of Jackendoff (1983). In fact, although we get there by a slightly different route, the net result of our analyses of categorical sentences is the same. Like Jackendoff (1976, 1983), I argue for a uniform lexical (morphosyntactic and semantic) analysis of 'be'.[6] However, our analyses do differ in certain respects. He would bring together in one "conceptual structure" all uses of 'be', which he represents as a single function "BE (x,y)." (Jackendoff 1983: 90). He does not analyze the function BE further, so that our conceptual analyses of 'be' are not precisely comparable. Furthermore, his uniform analysis of 'be' is sustained in the assignment of the same thematic relations, Theme and Location as postulated by Gruber (1976), to the functional arguments of 'be' (Jackendoff 1983: chs. 9-10). On the other hand, I question the constructs of thematic relations as primitives of an explanatory semantic theory (Other points of similarity/difference will be discussed in Chapter 1)

Originality. As for the originality of my analysis, this investigation does not lead me to invent any new constructs or theoretical systems. Instead I will employ some elements and principles from well-established systems of semantic analysis, attempting to incorporate them into generative grammar. In sum, my semantic analysis of categorical sentences is strongly influenced by works of Jackendoff, and in a way also by Aristotle and Sommers, but it differs from all of them as detailed in Chapter 1. Although I adopt some notions from TFL as described by Sommers (1982), my goal is to explain the semantics of the subject-predicate relation in linguistic terms, i.e., using linguistic evidence based on grammaticality and the "sayability" of English sentences, instead of the tools and techniques of symbolic logic. In so far as possible, my semantic arguments will depend primarily on the phenomena of linguistic inference, paraphrase and contradiction. (See, e.g., Kempson 1977, Smith and Wilson 1979: ch. 7, for a description of some criteria and tools for semantic analysis.) Unless otherwise indicated in the text, the criticism of alternative analyses and the argumentation for a categorical approach are my own.

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[6]Similarly, a uniform analysis of 'be' is proposed for example by Gruber (1976), Kahn (1973), and, in part, by Sommers (1982).

The central problem and organization of the thesis. Investigating the semantics of the sentence types illustrated in 1 above, one might obviously encounter many interesting linguistic problems concerning, e.g., pronominals, indexicals, quantifiers, determiners, tense, aspect, etc While in general I do not intend to ignore these problems, I will focus here specifically on the conceptual content of 'be' and the types of terms used with this verb. Of special interest for this thesis is the semantic relation that obtains when subject and predicate phrases (containing terms that belong to various ontological types) combine to form categorical sentences.

The present work is in five chapters. Chapter 1 contains theoretical and background information First, in section 1.1, I will outline the theoretical model and some basic principles of generative grammar that I shall apply here. Section 1 2 introduces some details of Aristotle's theory of categories and the subject-predicate analysis of categorical propositions within TFL as described by Sommers. In 1 2 2, I will discuss the ontological relation between language, mind and reality. Some general notions from classical semantics, *sense* or *intension*, *denotation* or *extension* will be reviewed. Jackendoff's notion of *projected world* will be compared and contrasted with these notions This section will conclude with a statement of my ontological position. The notions of *truth* and *reference* will be examined in section 1.2.3. Section 1.3 offers a brief critique of some alternative analyses of sentences containing 'be' within generative grammar, e.g., the analysis of individuation and categorization from Jackendoff (1983) (1.3.1) and thematic relations (1.3.2).

In accordance with the thesis of autonomy for syntax, which is assumed in this work, Chapter 2 deals strictly with the syntactic description of elementary sentences containing 'be'. Section 2.1 examines the NP-VP subject-predicate structure of sentences as analyzed within generative grammar. Section 2.2.1 considers the syntactic categorization of 'be' (i) as two categories: Verb and Aux (e.g., Williams 1984), or (ii) 'be' as a separate category: copula (e.g., Chomsky 1965). Using the devices of X-bar syntax, inherent lexical properties, and strict subcategorization, I argue for a one-lexeme analysis of 'be' as a full verb (V) (2.2.2). Section 2.3 concerns the syntactic analysis of the subject and predicate terms. As illustrated by the sentences in (1) above, the predicate complement may be a NP, AP, PP, or another VP.

Chapter 3 explores the problem of the semantic interpretation of elementary sentences containing 'be' This is the central part of the thesis: In section 3.1, a compositional semantic analysis is proposed for single elementary sentences containing 'be', that is, an analysis to account for the interpretation of individual sentences in isolation. As in classical semantics, I take the interpretation of an expression to mean its extension Extensions of expressions are described in terms of referents and the ontological types or categories to which they are said to belong. These notions are applied in the description of lexical meaning (3.1 1), phrase meaning (3 1.2) and sentence meaning (3.1 3) Section 3.2 concerns the semantic interpretation of sentences containing a relational verb, e g., 'hit', and 3.3, with sentences containing 'be' and relational predicate terms such as 'on the table', 'hit (by John)', 'hitting John'.

Chapter 4 examines some alternative proposals concerning the different "senses" or uses of 'be'. I take these proposals as examples of what the conceptual content of 'be' is not. First in section 4.1, the question of how many classes of 'be' there are is investigated from the semantic point of view I consider in turn the possibilities that 'be' might be (i) homonymous, (ii) meaningless, and (iii) polysemous. Each of these hypotheses is rejected, as I argue for a univocal analysis of 'be'. In section 4.2, I consider the conceptual analysis of 'be' as the relation of attribution or as the identity relation, arguing in favour of attribution (i.e., the relation of belonging that holds between referents and types.) In section 4.2, I consider the semantic distinctions between 'be' V and 'be' Aux in terms of the concept of *intentionality* as proposed by Williams (1984). Finally in 4.4, I suggest approaches to the analysis of idiomatic sentences containing 'be' with fixed subjects such as 'there' and 'it'.

In Chapter 5, I compare and contrast the analysis of elementary sentences containing 'be' according to the theory of thematic relations and according to the categorical analysis proposed and supported in this work. Section 5.1 poses some questions concerning the construct of Theme within Gruber and Jackendoff's theory of thematic relations. In section 5.2, I question the explanatory value of the theory of thematic relations with respect to active-passive sentence pairs (5.2.1), acceptable question-answer pairs (5.2.2), and linguistic inference (5.2.3). I show that whereas an analysis based on the assignment of thematic relations fails to account for such relations, a categorical analysis

based on referent(s) and ontological types or categories does shed light on these important intersentential relations.

Following Chapter 5 is the Summary of my analysis and conclusions.

Terminology and notation. In this work, I use the terminology and conventional notation of generative grammar and X-bar syntax found in standard works, such as Chomsky 1981, 1986. Other abbreviations will be explained in the text. I shall use phrase markers, as in 2 and 3 above, to illustrate the syntactic structure of sentences. Phrase structures may be abbreviated as labelled bracketing, e.g., [$_{I'}$ NP [$_{I'}$ INFL VP]]. I shall also use unlabelled bracketing to indicate partial structural analyses. For example, some essential elements of elementary sentences containing 'be' are represented as [NP be XP]. An asterisk enclosed within parentheses (*) following sentences used as linguistic examples indicates ungrammaticality; a question mark (?) indicates unacceptability or "unsayability," but not ungrammaticality. In general, I shall use underlining for emphasis.

Linguistic semantic relations will be seen to involve three theoretical systems: language, conceptual constituents (concepts) and extralinguistic entities in the domain of discourse. (Of course, linguistic expressions and concepts may also be the objects of reference, but the three systems can always be distinguished.) I will now introduce the metalanguage that I will use in the following chapters to refer to elements of these three systems and their relations. The relation between expressions and entities in the domain of discourse is designated by the verb 'denote'. 'Signify' is a two-place relation between expressions and concepts. The concept that is signified by a categorematic expression determines its extension. Such an expression thus designates a concept and denotes its extension, which may be an entity or a type of entity. Strictly speaking, an expression never refers to anything; only speakers can refer to entities in a particular domain of discourse by using certain ("referential") expressions of language.

When I use expressions intending their ordinary extralinguistic referents as in 5 (a), roman font and no punctuation will be used (except for quotations, where double quotation marks will be used.) I will distinguish between expressions and concepts by enclosing expressions in single

quotation marks as in 5 (b) and indicating concepts in italics as in 5 (c). As mnemonic devices, I will use the following typography and punctuation in the text to follow.

5 (a) extralinguistic entities: The dishwasher is noisy.

(b) expressions: 'Who' is a 3-letter word.

(c) concepts: His notion of *reference* is different from mine.

As technical terms for 'concepts' as in 5 (c) and 'extralinguistic entities' as in (a), I may sometimes use either 'sense' or 'intension' and either 'denotation' or 'extension', respectively. These notions will be examined further in Chapter 1. In Chapter 3, they will be used within a compositional interpretive semantics to describe lexical meaning, phrase meaning and sentence meaning.

Chapter 1

Theoretical framework and background information

As announced earlier, my objective in this dissertation is to present an analysis that will serve as a basis for explaining how competent speakers of English can interpret categorical sentences. Before entering into the details of the linguistic analysis (which begins in Chapter 2), I will state the theoretical assumptions underlying the position outlined in the introduction and the problems described there. For instance, I will explain why the basic questions addressed in this work are stated in terms of units of syntactic structure and units of conceptual structure, rather than in terms of syntactic relations or semantic relations. Also I wish to clarify the semantic notions to be applied and the terminology to be used throughout this work.

The semantic theory and also the linguistic analysis that I support in this work reflect ideas that have been taken from several different sources. Perhaps no single theory is quite perfect, but many scholars who represent very different systems of analysis, from the ancient to the contemporary, have made valuable contributions towards the semantic description of categorical sentences. In this chapter, I will review the basic notions underlying only a few of the analyses that have been published previously. The main task is to select from these the theoretical constructs that seem essential and that may be applied in a coherent semantic analysis of elementary sentences containing 'be'

Overall, the main purpose of the present chapter is to set out the theoretical apparatus that I take to be essential for an adequate account of speakers' linguistic semantic competence. This chapter is in four parts. First in section 1.1, I will outline the theoretical model and some guiding principles of generative grammar that I shall assume in this work. As a point of departure, basically I accept the mentalist theory of language proposed by Chomsky (1975, 1981, etc.) and the conceptualist approach to semantic analysis described by Jackendoff (1983), although I do not agree with the latter in every respect, as I shall explain here. In section 1.2, I will compare some elements of Chomsky's and Jackendoff's approaches with the received opinions from traditional logic and from classical semantics.

Section 1 2 1 presents a brief exposition of the syntactic subject-predicate analysis of categorical propositions within TFL as described by Sommers (1982) Section 1 2 2 concerns the semantic relationship between elements of language, mind and reality Here I shall review and compare some notions from classical semantics (e g , Carnap's notions of *intension* and *extension*), from Aristotelian logic and its tradition (e g , the notion of *category*), and from Jackendoff's *Semantics and cognition* (1983) (e g , the notion of *projected world*) I will conclude this section with a statement of my ontological position and review the notions of *truth* and *reference* in 1 2 3 Section 1 3 offers a brief critique of some specific alternative semantic analyses of sentences containing 'be' within generative grammar, e g,, Jackendoff's account of categorization (1 3 1), and semantic roles or thematic relations (1 3 2)

1.1 Generative grammar and linguistic semantic competence

My purpose here is to introduce some basic notions from generative grammar that I shall assume in this work What are the general theoretical and methodological principles of generative grammar that are relevant for a semantic analysis of elementary sentences containing 'be'?

Competence and performance. In generative grammar, a crucial distinction is made between the notions of *competence* and *performance* The primary object of investigation in this framework is linguistic competence, i e , the speaker-hearer's tacit knowledge of his or her language In this context, linguistic *competence* is contrasted with linguistic *performance*, i e , "the actual use of language in concrete situations " These characterizations of competence and performance come from Chomsky (1965 4) According to him, the "linguistic theory is mentalistic, since it is concerned with discovering a mental reality underlying actual behavior " The generative grammar (postulated by a linguist) presents a "description of the speaker's linguistic competence" (Chomsky 1965 4) The primary function of language in this perspective is taken to be the expression of thoughts Language is used as a basis for inferring the structure of thought, or more precisely, the structure of language is used as evidence for the structure of thought A mentalistic theory of language thus imposes

implicit language-like structural constraints on the corresponding cognitive structures. Accordingly, Jackendoff (1983) makes a "methodological decision to pursue a theory of cognition in the *structural* mode" This is opposed to a study in the process mode, which he describes as the domain of psycholinguistics The "study of strategies employed in processing grammatical structure in real time" would be the object of a theory of linguistic performance (Jackendoff 1983 5-7)

The goal of linguistic description within generative grammar is to determine the nature of the structural information that constitutes linguistic competence Chomsky (1982 4) distinguishes two "perspectives in the study of grammar, one which emphasizes rule systems and the other, systems of principles" He subdivides the rule system for a particular language into "three basic parts

1 (A) The lexicon

(B) Syntax (i) Base component
(ii) Transformational component

(C) Interpretive components (i) PF [phonetic form] component
(ii) LF [logical form] component

In this framework, descriptive problems concerning the specific aspects of linguistic competence are generally relegated to one of four grammatical components lexical, syntactic, phonological and semantic These grammatical components are supposed to be autonomous but interrelated The assumption of autonomy is a methodological expedient for clarity in linguistic analysis (See Chomsky 1977 for discussion) The semantic and phonological components interpret phrase markers that have been generated by the syntactic component Syntactic structures are thus conceived as functionally central The syntactic component contains well-formedness conditions (WFCs) for the structure of phrases and sentences It is assumed that there are at least two distinct levels of syntactic structure, D-structure and S-structure Some grammarians also conceive of LF as an additional level of syntax [1] Rather than attempting to establish the syntactic structure of linguistic meaning, in this dissertation, I am interested in formulating principles by which S-structures can be interpreted In

[1] A question of current interest in linguistic theory concerns the nature of the logical form of sentences. For discussion and criticism of logical form as conceived in Chomsky's (1981) model, see Carlson (1983) and other papers from a conference on LF, *Linguistics and philosophy*, v. 6, 1983

any case, both generation and interpretation are based in part on input from the lexicon, which contains phonological, morphological, syntactic, and possibly semantic information about lexical entries It is assumed that all linguistic features of lexical items to which grammatical rules and principles refer, as well as idiosyncratic features of the lexical items, must be represented in the lexicon, as suggested by Halle (1973)

To account for the universal features of natural language, as Chomsky (1982) notes, current (GB) research in generative grammar, focuses on the study of systems of principles He identifies several subsystems of principles that hold of rules and representations· e.g., X-bar theory, θ-theory, Government theory, etc (Chomsky 1982 6) One of the objectives of Chomsky's research programme is to identify general linguistic parameters which are present but whose values may vary from one language to another. Rules and/or principles are postulated to account for generalizations that form part of the speaker's linguistic competence Even for particular languages, the rules are postulated as guiding principles or well-formedness conditions rather than as hard and fast rules or processes that are actually used by speakers to produce sentences The subsystems of principles presuppose and apply to lexical elements and formatives in phrase markers, but the principles do not "create" the structures themselves By eliminating redundancies from the total theory, Chomsky hopes that ultimately, it will be possible to restrict the number and variety of grammars, thus achieving an explanatory theory of universal grammar (UG) Naturally, it is assumed that any explanatory theory is necessarily adequate from a descriptive point of view, i.e , it is consistent with and can account for the natural language data available (Chomsky 1982. 7-8).

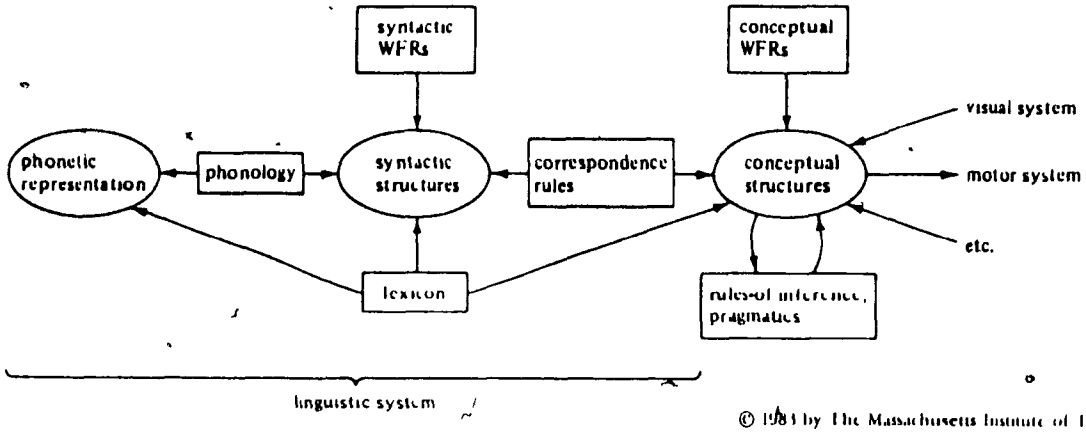
Linguistic system and conceptual structures. The description of semantic interpretation is not always taken to belong to the domain of generative grammar For instance, Chomsky (1957. 93) considers meaning to belong to the domain of language use. (See also Chomsky 1977· 43.) This is not to say that generative grammarians see the study of semantics as irrelevant for a theory of natural language, as charged by Katz (1980). To the contrary, since Chomsky (1957), several important steps have been taken to integrate semantics into generative grammar, as

represented, e.g., by Katz and Fodor (1963), Jackendoff (1972), Chomsky (1972, 1975, 1977, 1979, etc.). According to Chomsky (1977 42), a "major problem" of linguistic theory is to determine the highly "systematic connections between form and meaning." Already in (1965), Chomsky notes that "semantic considerations are relevant to the construction of a general linguistic theory (i e, obviously the theory of syntax should be designed so that the syntactic structures exhibited for a particular language will support semantic interpretation" (Chomsky 1965 226, n 15) In fact, ideally, one might assume that the best syntactic description is one that captures syntactic generalizations in the simplest and most coherent way and also organizes strings of a language into units that are interpretable in a plausible way

One motivation for putting semantics into the grammar involves learnability. Apparently children make use of semantic information in learning syntactic categories and structure (See Macnamara 1982 and other literature discussed there.) Thus, it is not sufficient to argue vaguely that since language by definition has meaning, or better, since words and sentences are "meaningful" (Quine 1948 198-199), semantics cannot be omitted from the complete study of a human language However, there may be reasons to suppose that some elements that are often assumed to belong to the semantic component of language are also employed in other cognitive activities apart from language For instance, Husserl identifies linguistic meanings with the meanings or *noematic Sinne* of acts in his theory of intentionality and phenomenology (See Smith and McIntyre (1982) for a presentation of his ideas) Such a position is compatible with Chomsky's mentalistic theory of language and his ideas concerning the structure of the linguistic system with respect to other conceptual structures of the mind. (See, e.g, Chomsky 1975)

In contrast to the assumption that has guided much of the early research in semantics within generative grammar, Jackendoff (1983 209) claims that there is no autonomous level of grammatical structure that concerns just the semantics of language Rather, linguistic "semantic structure is the same level of representation as conceptual structure", or, "Semantic structure is conceptual structure," as he claims in the title of Chapter 6 of *Semantics and cognition* In this work, Jackendoff seeks an explanation for the fact that speakers can talk about what they see and hear, as well as what

they experience through other (non-linguistic) modalities His so-called "*conceptual constraint*" on semantic theory and the related Conceptual Structure hypothesis encapsulate his explanation for this (See Jackendoff 1983 17) He hypothesizes that there is a "single level of mental representation onto which and from which all peripheral information is mapped" Furthermore, conceptual representations (linguistic, visual, motor, etc) are supposedly constrained by an innate system of conceptual well-formedness conditions The following diagram is the model proposed by Jackendoff (1983 21)



(As Jackendoff notes (1983 9), here "Rectangles represent rule components and stored lexical information, ellipses represent types of structure generated by or effected by rule systems")

For Jackendoff, a major task is to characterize the universal, finite set of conceptual well-formedness conditions (1983 19-22) Semantic interpretation of sentences is effected by correspondence rules that map syntactic structures onto conceptual structures, the conceptual structures corresponding to entries in the lexicon and to phrases. Thus, for semantic interpretation, the lexicon and the syntactic component of the grammar are basic since they furnish the lexical items (with rules for their formation and use) and the syntactic structures that are subject to interpretation.

In his exposition of the model of the linguistic system and conceptual structure Jackendoff does not take a stand on the kind of semantic information, if any, that is represented in the lexicon of the grammar (1983 111). Taking this question in the context of the autonomy thesis for syntax, I

wish to assume the strictest hypothesis possible. As far as semantic information is concerned, I assume that the lexicon is simply a list of the names of type concepts. In this case, the internal structure of a given concept is accessible to syntactic rules only via the lexicon or via the correspondence rules that link syntax and conceptual structures. The generalizations that are significant for the linguistic analysis of elementary sentences containing 'be' are based on units of syntactic structure and units of conceptual structure associated with lexical items

In this work, I will simply assume, without argument, that Jackendoff's conceptual hypothesis is basically correct One may, however, accept this hypothesis without at the same time admitting all of the claims of Jackendoff's argumentation. Assuming Jackendoff's conceptual hypothesis, one might consistently reach different conclusions for semantic theory That semantic structures are compatible with general conceptual structures of the mind seems highly plausible A supportive fact is that speakers can and do talk about their perceptions and sensations, as Jackendoff argues. But he claims that ordinary speakers do not actually "see" the real world. They have conscious access only to a projected world, "the world as unconsciously organized by the mind." (Jackendoff 1983 29) To make his point, Jackendoff minimizes the contribution of environmental input ("the real world plays only an indirect role in language.") and maximizes the contribution of the "active principles of the mind that impose structure on the input " (Jackendoff 1983 24) He concludes that "*the information conveyed by language must be about the projected world*." (Jackendoff 1983 29) (I will inquire further into the nature of the projected world in 1.2.2.)

For the present, I will point out an important consequence of the conceptual hypothesis for semantic theory. A strict dichotomy is often made in generative grammar between lexical semantic knowledge and general semantic knowledge (e.g., Chomsky 1975, 1979). To illustrate this, among other aspects of meaning that can be expressed "on the level of semantic representation, separate from extralinguistic considerations" Chomsky would include "semantic relations between words like 'persuade', 'intend', 'believe'." He gives examples of sentences that are related to each other in terms of their truth conditions or implications. For example, he says, "If I persuade you that today is Tuesday, then you believe that today is Tuesday. These are facts of language and not of the external

world." (Chomsky 1979: 142). Views also differ as to whether or not selectional restrictions have a place in the grammar, and if so, whether they are semantic or syntactic. Jackendoff (1972: 17-20), argues that they should function as well formedness conditions on interpretations. Others consider selectional restrictions to represent extralinguistic knowledge (e.g., Botha 1981: 70-77, Haas 1973) which should be excluded altogether from the study of language. Given Jackendoff's conceptual structure hypothesis, in which he claims that there is no strictly linguistic semantic knowledge, it would seem less urgent to look for criteria to distinguish between extralinguistic knowledge of the world and linguistic semantic knowledge. Nevertheless, I shall assume in this work that the semantics-pragmatics distinction is worthwhile.

Linguistic semantic competence and pragmatics. Giving up the distinction between strictly linguistic semantic knowledge and extralinguistic knowledge, Jackendoff (1983. 208) claims that the "semantics-pragmatics distinction is artificial and should be abandoned" Perhaps this is related to his rejection of the notion of *truth* as a foundational notion for linguistic semantics (See 1:2.3 for a discussion of truth.) Such a distinction is generally assumed within generative grammar and should be maintained, in my view, at least as a guiding principle Even though a separate grammatical component is not postulated for semantics, I assume that linguistic semantic competence is still the proper object for the study of semantics within generative grammar Just as the rule-based competence grammar is said to provide an account of the speaker's ability to create novel sentences and to make judgements about the grammaticality (well-formedness) of the sentences that are uttered, one could show how the competence grammar and conceptual structure together provide a basis to account for the speaker's ability to interpret well formed sentences.

In this thesis, I will maintain a methodological distinction between grammatical, semantic and pragmatic factors, as traditionally assumed within generative grammar. Since it is always necessary to limit the domain of one's investigation, it seems expedient to distinguish between the relative domains of the theory of linguistic (or logical) semantics and a theory of language use. A distinction is made by several theorists, using various terms, between "full" meaning and "linguistic

meaning" (e.g., Barwise and Perry 1983: ch. 2, Bellert 1980-81, 1987), "literal meaning" (e.g., Searle 1980), "SR-1" (Semantic representation-1) (e.g., Chomsky 1975: 105). The term 'logical form' was chosen, according to Chomsky (1979: 145), "to designate a level of linguistic representation incorporating all semantic properties that are strictly determined by linguistic rules." In terms of priority, notice, for example, that pragmatic theories (or fragments thereof), e.g., speech acts (Austin 1962; Searle 1969), conversational implicatures (Grice 1959, 1975), situation semantics (Barwise and Perry 1983), all presuppose a theory of linguistic semantics. These theorists also attempt to offer some criteria for distinguishing between semantic and pragmatic factors.[2]

1.2 Some notions from logic and from classical semantics

Many of the notions that are now generally considered to be essential for the semantic analysis of natural language sentences have been inherited from the study of logic. Although different terminology is often used, some of the same underlying assumptions and the consideration of similar problems can be traced from ancient through modern treatises on logic (Arens 1984, Nuchelmans 1973, 1980). But how apt, we must ask, are the tools and techniques of logical analysis that have been (or could be) adopted for linguistic analysis? For the goodness-of-fit between logical representations and natural language sentences, Sommers (1982) compares and contrasts two major schools of thought: TFL (traditional formal logic based on Aristotle) and MPL (modern predicate logic based on Frege). Sommers insists that both logics should be tested in grammatical analysis. At present, however, whenever linguists employ a system of symbolic logic it seems they usually turn to MPL, following current tendencies in science and mathematics. Sommers demonstrates that TFL is

[2]Bellert (1980-81), e.g., suggests a formula for determining the linguistic meaning of an expression. From the full meaning of a sentence (conceived of as a set of conclusions) it is necessary to subtract certain conclusions which are accounted for by a theory of language use. One must subtract certain background information and knowledge. The pragmatic factors outlined by Barwise and Perry (1983) include information concerning who the speaker is, the exact time of utterance, the speaker's relation to or attitude toward what is being talked about, and other elements involving the speaker, the situation, and/or the context of utterance.

more adequate since, as he claims, its syntax corresponds to the structure of sentences of natural language (1982: 2, 48).

Many linguists would agree with Sommers as to the striking dissimilarity between surface structures of natural language sentences and representations in MPL notation. (See, e.g., McCawley 1978; Jackendoff 1983) For me, the most obvious discrepancies between natural language sentences and MPL representations involve the following features: the number and order of the symbols (meaningful signs or expressions) and the semantic classification of the symbols. Even in the simplest cases, MPL representations violate the Grammatical constraint (Jackendoff 1983: 13-16), by which it is expected that logical (or conceptual) representations be reflected by the surface structures of sentences. Consider the following categorical sentences in English,

1 (a) Pat is a bachelor.

(b) Steph is fat.

(c) A cat is on the mat

(d) No one is here.

which might be represented in MPL as follows:

2 (a) Bp

(b) Fs

(c) $\exists x (Cx) \wedge \exists y (My \wedge O (x,y))$

(d) $\sim \exists x (Px \wedge Hx)$

where 'B' stands for "is a bachelor," 'p' for "Pat;" 'F' stands for "is fat," 's' for "Steph;" 'C' stands for "is a cat," 'M' "is a mat," 'O' "is on;" 'P' stands for "is a person," 'H' for "is here," '$\exists$' stands for "there exists," '$\sim$' for "it is not the case that," '$\wedge$' for "and." The verb 'be' and other lexical items (in fact entire classes of lexical items) are never explicitly or distinctly represented in MPL notation. These include, besides the copula, determiners, linguistic quantifiers, etc. What <u>is</u> represented for categorical sentences (besides the logical notions designated by special symbols) are logical subjects

and logical predicates. The logical subject is represented by a lower case letter (designated 'a','b', 'c', etc.). The logical predicate is represented by a capital letter. Logical subjects and predicates are usually symbolized in the order illustrated here by the predicate variable 'F' and an individual variable 'x' 'Fx' This is read as "x is an F" or "x has the property F "

When linguists object to MPL, it is primarily because the logical subjects and predicates simply do not correspond structurally to grammatical subjects and predicates of sentences of natural languages, except for certain sentences known as "atomic sentences," e.g , 1 (a)-(b) represented in 2 (a)-(b) Notice that 2 (a)-(b) each contain one subject and one predicate symbol, while 2 (c)-(d) each contain two or more predicate symbols and three tokens of the subject variables. This discrepancy between the syntactic analysis of natural language sentences and the logical representation stems in part from the thesis of semantic asymmetry between subject and predicate Semantically, logicians within MPL make a clear and sharp distinction between singular and general terms Only singular terms can function as subjects while only general terms can function as predicates The subject is said to denote a "particular" while the predicate is said to designate a "general concept" (e.g., Quine 1960; Strawson 1974). But clearly sentences that have the denotative properties of "atomic sentences" compose only a subset of the sentences of English And as far as I know, sentences of the type illustrated by 1 (a)-(b) do not have any privileged status in the total class of sentences that constitute any natural language. But clearly a general noun such as 'cat' 1 (c) may function as the head of the grammatical subject phrase in a natural language sentence In contrast, the subject phrase is represented in MPL by a predicate symbol and a subject variable, e.g., "an x. x=a cat." For sentences of the surface form [NP be NP], e.g.,

3 (a) This is Steph.

(b) Steph is a chef.

(c) Steph is my tennis partner/My tennis partner is Steph.

(d) My tennis partner is a chef.

(e) A chef is my tennis partner.

the so-called semantic asymmetry principle (or logical subject-predicate restrictions on the two NP positions) simply does not apply to sentences of English Among the sentences in 3, there are examples of the three NPs ('Steph', 'a chef', 'my tennis partner') that occur either in the subject position or in the predicate in different sentences. It seems more plausible to attribute any difference in function to the different syntactic positions of the NPs (the subject or predicate complement positions) rather than to a difference in their denotation. This accords with Sommers' observation that subject and predicate terms need not be distinguished on the basis of semantic criteria, indeed, within TFL they are not "discriminated" in the same way as for atomic sentences within MPL (Sommers 1982 41) It also accords with the notion of a productive (generative) grammar The language system consists of a finite set of repeatable lexical items and a finite set of rules and principles for combining the lexical items Individual lexical items may be repeated by speakers in different grammatical contexts to create an indeterminately large number of sentences. Thus, it is certainly not necessary to posit separate lexical entries for expressions that may function acceptably as singular or as general terms The grammar of English does not need two lexical items for 'chef', e g., one that would designate a general concept as expressed in 3 (b) and another that would designate a particular individual as in 3 (e) This would be unnecessary duplication of the basic units of structure

Without further discussion, I shall take it for granted that the symbolic system of MPL is inadequate for the conceptual representation of categorical sentences of English. This is not to say that logicians working within MPL have not made important contributions toward the semantic analysis of natural language. In fact, it is uncertain how far either logic can be applied in the linguistic semantic analysis of categorical sentences in English without modification. Next, I wish to consider some specific claims and contributions of TFL, first from the point of view of syntax (1 2 1) and then from the point of view of semantics (1.2.2).

1.2.1 Subject-predicate analysis of categorical sentences

My chief objective in this section is to demonstrate why a syntactic analysis of categorical sentences based on categorial units of structure is preferable to one based on functional (grammatical) relations such as subject, predicate, object, etc

Traditionally sentences of English (and other Indo-European languages) have been parsed into two functional units, subject and predicate, as shown for the following sentences

	Subject	Predicate
1 (a)	All victims	were children
(b)	No victims	were children
(c)	Some victims	were children.
(d)	Some victims	were not children.

This functional bipartition can be traced back through traditional grammar all the way to Aristotelian two-term logic, which was designed specifically to represent categorical propositions The sentences in (1) illustrate the "four different standard forms of categorical propositions" (Copi 1982 178) The difference in form depends on the quantifier (universal or particular) used and the affirmative or negative quality of the proposition Standard-form propositions are the constituents of categorical syllogisms (or the logical arguments) of Aristotle's deductive system (For details on these subjects, see, e.g., Copi 1982: chs 5-6, Sommers 1982.) At this point, I do not wish to consider syllogisms or the phenomenon of logical or linguistic inference. (But see 5.2.3) Although my dissertation is not limited to sentences of this form, for the moment, I will focus on the internal structure of a single standard form categorical proposition and the important claims of TFL that might be applied in a linguistic analysis of categorical sentences.

First of all, as for the priority of categorical propositions, Aristotelian scholars maintain that for every natural language sentence containing a verb other than 'be', there is a paraphrase containing 'be' (See, e.g., Sommers 1982: 167-168.) Thus, it is claimed, all declarative sentences have the

same logical form as categoricals, or they are paraphrasable as categorical sentences. Consider a sentence containing the verb 'hit'.

2 (a) Steph hit a chef.

Perhaps not all of the following sentences would count as paraphrases, but they are related to (2a) semantically, i.e., in terms of truth.

2 (b) Steph is the hitter of a chef.

(c) Steph is the one who hit a chef.

(d) A chef was hit by Steph.

If sentence (2a) were true then for a fixed context, sentences (2b-d) would also be true. In other words, one could not accept (2a) as true and simultaneously deny (2b-d). Although this is a study of elementary sentences containing 'be', for comparison and contrast, I will also examine simple sentences containing other relational expressions, e.g., the verb 'hit'.

Let us begin by examining the internal structure of a standard form categorical proposition. It seems that TFL and the generative syntax of Chomsky agree on at least one basic principle: the analysis of a sentence into subject and predicate depends strictly on the form of the sentence. According to Sommers (1982: 47), "In basic sentences of TFL, there is one subject and one predicate," and they are distinguished syntactically in terms of their syncategorematic (logical) elements.[3] The subject contains "a sign of quantity," and the predicate, "a sign of quality," as illustrated by the following schema (Sommers 1982: 17).

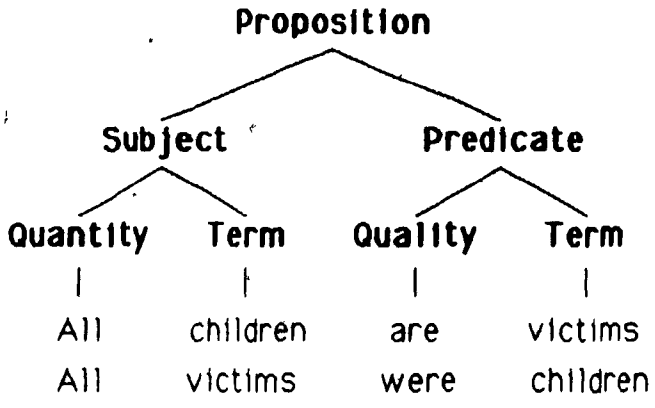
3

Subject		**Predicate**	
some/every	X/non-X	is/isn't	Y/non-Y
quantity	term	quality	term

[3]As suggested in the introduction, the distinction between syncategorematic and categorematic elements is roughly equivalent to the distinction in linguistic terms between *function (logical* or *grammatical)* words and *lexical* words. These terms are described in 1.2.2.

A standard-form proposition is thus subdivided exhaustively into two major constituents, subject and predicate, each of which is further subdivided into two parts. The following structure (suggested by Englebretsen 1981: 85) might represent the essential elements of a proposition in terms of purely functional notions

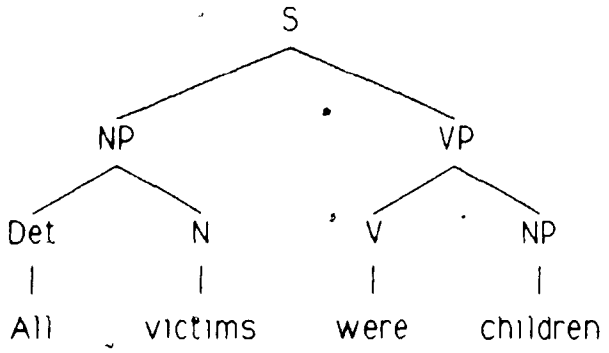
4



According to this analysis, the subject of a standard-form proposition is "a quantified subject term" and the predicate is "a qualified predicate term" (Englebretsen 1981 14) Modifications of propositions, e g., by change of modality, by negation or interrogation, are achieved by attaching various signs (particles or affixes) to elements of either the subject or the predicate, or by changing the order of certain elements For example, notice that negation may be indicated in one of four possible elements in 3-4. in the signs of quantity or of quality or in either the subject or predicate term

Sommers explicitly likens a TFL subject-predicate standard analysis of propositions to the syntactic "NP-VP" analysis He notices the "integrity" of the whole subject as NP and of the whole predicate as VP (Sommers 1982 288). Linguists, however, are more likely to express these integral relations conversely; that is, we notice that the NP as a whole functions as the subject and the VP as a whole functions as the predicate of the sentence. Traditional grammar, which reflects some of the principles of Aristotle's philosophical system, would subdivide all sentences into two main obligatory constituents corresponding to the subject and predicate (Lyons 1968: ch. 7). This functional bipartition is immediately visible in the following simplified tree diagram.

5



Generally the first NP is taken uncontroversially to function as the subject The predicate then, as Jespersen (1937 134) defines it, is "the whole of a sentence minus the subject" This seems to express the view that is shared by most linguists and logicians who are influenced by TFL following Aristotle (Wilson 1924 166) This phrase marker represents the "NP-VP" analysis of the same sentences as in 4 The NP (subject) and the VP (predicate) nodes are positioned symmetrically within the hierarchical structures of both 4 and 5 For the sentences in 1, it seems that at this level of general structure, the NP and VP phrases of 5 correspond exactly to the subject and predicate of 4

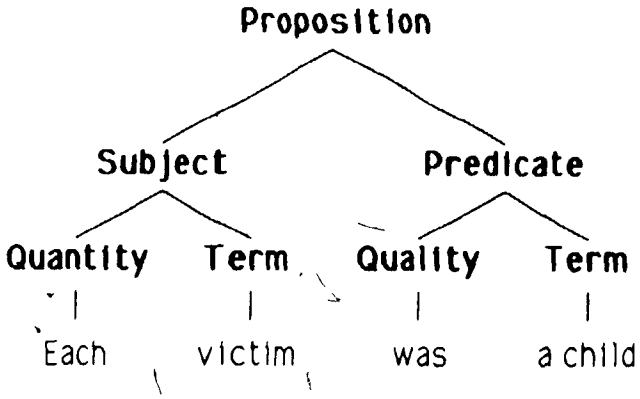
Thus it may appear at first sight that the syntactic description within traditional grammar would parallel the subject-predicate analysis according to TFL In 4, the subject and predicate units appear to be structurally symmetrical with respect to both their relative positions within the hierarchical structure of the proposition and their internal constituency The subject and predicate units have parallel internal structures in 4 both are composed of one syncategorematic element (a sign of quantity and a sign of quality, respectively) and one categorematic element (a term)

The syntactic analysis of the expression that is analyzed as a "term" in TFL is a controversial point The problem is this A term corresponds to more than one syntactic category in generative grammar This suggests that it is not suitable as a basic unit of analysis in a purely syntactic description of categorical sentences. To see that the internal structures of the phrases analyzed as "terms" in the subject-predicate analysis are not truly parallel, we must examine other sentences Consider the following example.

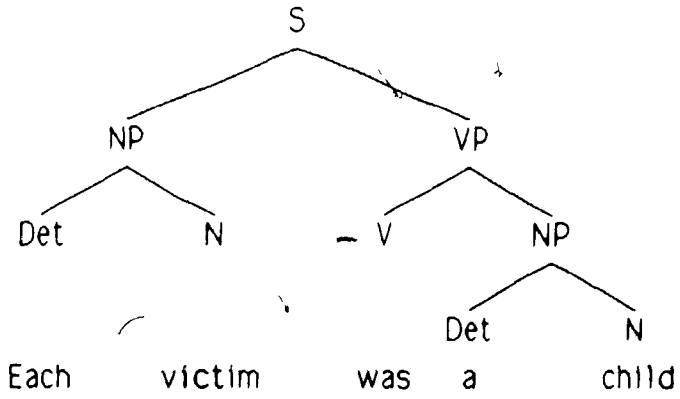
6 Each victim was a child

For this sentence type there is a small discrepancy between the analyses based on TFL functional units and on traditional syntactic categories The general problem can be exposed more readily by comparing the two structures

6 (a)



6 (b)



Indeed, in both 6 (a) and (b), the NP/subject and VP/predicate nodes are symmetrically positioned within the hierarchical structures of the proposition and sentence. In (b), however, there is an obvious asymmetry not only in the status of NP and VP as different categories (i e , NP versus VP), but also in their internal constituency There is what Chomsky (1981. 249) discusses as the "asymmetry of subject and object " Although the VP node is itself on the same level of structure as the subject NP node, the two NPs in 6 (which correspond to the subject and predicate term in 6 (a)) differ in their dominance relations The first NP (subject) is dominated directly by S, the second (the predicate

term), by VP The NP that functions as the subject is an immediate constituent of S, whereas the NP that functions as the predicate term is embedded within another phrasal constituent of S, the VP The two NPs are thus distinguished syntactically by their formal positions one is dominated immediately by S, the other is a sister to the verb 'be' which "governs" it (Chomsky 1981 36, 1986 8) The second NP depends on the verb 'be' in that it functions as the predicate complement, as might be required by the verb's subcategorization frame (This is consistent with the analysis that I will propose in 2 2 2)

There is another apparent asymmetry between the terms in the functional analysis in 4 (Cf 6 (a) and 6 (b)) The subject term of 6 (a) corresponds to a lexical category N in 6 (b), whereas the predicate term corresponds to a phrasal category NP For TFL, a sign of quantity is an essential element for the subject, but not for the predicate Here it is not entirely clear why the indefinite article 'a' in the expression 'a child' would be analyzed as a sign of quantity when it appears in the subject position, as in 7 (b), but <u>not</u> when it appears in a <u>predicate</u> term, as in 7 (a)

7 (a) Each victim was <u>a child</u>

(b) <u>A child</u> was the victim

In this respect, the TFL analysis has the same defects as the MPL analysis (see the introduction to 1.2 That is, in 6 and 7 (a), the expression 'a', which is repeatable in other contexts, is assigned no syntactic category whatsoever when it introduces a predicate term

All in all, the TFL analysis of categorical propositions comes closer to meeting the grammatical constraint (Jackendoff 1983 13-16) than an analysis according to MPL does, but the TFL model still does not fit the surface structures of the corresponding categorical sentences of English perfectly either Furthermore, the TFL analysis harbours a theoretical anomaly In purely syntactic terms, it would seem that the <u>internal</u> structure of a given expression, e.g., 'a child', should always be identical, regardless of its (<u>external</u>) distribution This is one of the significant insights of X-bar syntax based on the maximal projections of lexical categories

To summarize the problem for TFL, 'term' does not signify a purely structural notion As indicated above, some predicate terms have the same structure as the subject as a whole Or, in other words, the syntactic analysis of the whole subject applies equally to the predicate term when it corresponds to NP [4]

Despite the fact that the TFL structure meets the grammatical constraint better than MPL, this analysis is still problematic for linguistic description Although the problems seem small, I think that the structural discrepancy is not insignificant Now I wish to illustrate the general problems involved in attempting to analyze syntactic phrases as terms, rather than as specific syntactic categories Consider the following claim Sommers (1982 17) notes "that every logical subject contains a term and that the subject term of a proposition is interchangeable syntactically with the predicate term " The following are Sommers' examples

8 (a) Some Spaniards are philosophers

(b) Some philosophers are Spaniards

Sommers (1982 300) says that the predication expressed by the sentences in 8 is natural in both directions This implies that either N, 'Spaniards' or 'philosophers', can function as the natural

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[4]It ~~is~~ important to bear in mind that the TFL analysis is designed for standard-form propositions To be fair, notice also that Sommers does <u>not</u> claim that a predicate complement of an ordinary categorical sentence in English cannot be quantified. He states that in the TFL analysis of standard-form propositions a sign of quantity is essential for subjects In Sommers' analysis, relational terms (containing, e.g., transitive verbs) are also analyzed as subject-predicate sequences What is traditionally called a "direct object" then is referred to as a logical "subject" in TFL (Sommers 1982. ch 7). The subject is always analyzed as a syntactic complex which corresponds roughly to the two constituents of a phrase: [Det + N]. To extend the TFL analysis to singular "atomic" sentences (which normally lack any formal element to serve as an explicit "sign of quantity" in the surface string), the notion of *wild* quantity is introduced. Thus some expressions that can function as subject terms without an explicit sign of quantity, e.g., proper names and pronominals (Sommers 1982 chs. 3-5, 11-12), are considered to contain an implicit "sign of quantity," (or "wild" quantity, which is in this case either universal or particular), as illustrated in the following syllogism.

(i) (Some/every) Aristotle is a man
(ii) (Some/every) Aristotle is wise.
(iii)Therefore, some man is wise.

Sommers attributes to Leibniz the idea "that singular propositions have wild quantity " He says that "the reason that we do not bother to specify the quantity of 'a is P' is precisely because either will do." (Sommers 1982: 29)

subject term. Notice that the quantifier is the same in the NP that functions as the subject of the two sentences Interchangeability does not mean, however, the reversibility of any two Ns (subject and predicate term)

9 (a) Each victim was a child

(b) A child was each victim

One difficulty is this Categorical sentences whose predicate terms belong to syntactic categories other than N, where the term is an A, P, or another V, do not permit the interchange of subject and predicate terms To illustrate, the expressions underlined in the following sentences would be analyzed as terms

10 (a) Each victim was a child.

(b) Some Spaniards are famous

(c) Every emu is in the zoo.

(d) The chef is working

It seems clear, however, that for English there is no syntactic principle which permits the mere reversal of terms The following sentences (with terms underlined) are neither grammatical nor acceptable.

11 (a) Each a child was victim (*)

(b) Some famous are Spaniards (*)

(c) Every in the zoo is emu (*)

(d) The working is chef (*)

These predicate terms are not interchangeable grammatically with the subject terms without other morphosyntactic modifications. Aristotle discusses the feature of convertability in conjunction with essentiality. (See 1.2.2.) The notion of *term* may have more significance for semantics than for syntax. However, we must bear in mind that the principles of TFL apply to standard-form propositions, not to all ordinary sentences of English.

Adopting an Aristotelian approach in one's semantic analysis of categorical propositions does not necessitate the adoption of the syntax of TFL I will not use a syntactic analysis of categorical propositions outlined, but instead adopt as a working hypothesis the phrase marker 2 diagrammed in the Introduction, which uses the category symbols from generative X-bar syntax My choice of category symbols is strongly influenced by the careful distinction between categorial and functional notions made by Chomsky in "Categories and relations in syntactic theory" (1965 ch 2) Here he argues against the idea of representing functional notions such as 'subject' and 'predicate' in phrase markers These, he says, are "inherently relational" notions It would be a "fundamental error," according to Chomsky, to regard "functional notions as categorial" The functional relations presuppose the sentence structure and they can be defined in terms of configurations of categories He states the following configurational definitions for the subject and predicate of a sentence within the Extended Standard Theory (EST)

12 (a) Subject-of [NP,S]

(b) Predicate-of [VP,S]

The subject of a sentence is the NP immediately dominated by S, as generated by the PS rule stated in categorial terms 'S → NP VP' Thus the relation may be specified as [NP,S] [5] It is important to notice that NPs do not have the inherent property of being a subject of a sentence. Thus there is no rule that generates all and only subjects of sentences In fact, Chomsky argues against the inclusion of terms such as 'subject' in phrase structure rules on the grounds that they would be redundant The functional notions are implicitly represented in the phrase marker using syntactic category symbols or they can be "extracted from the rewriting rules of the base" Chomsky notes further that such rules "have the defect of failing to express properly the relational character of the functional notions" (1965 73) I think that Chomsky's view here is correct

[5] For all grammatical relations the domain of discourse is the set of linguistic expressions. The domain of the relation 'subject-of' is the set NP; of the relation 'predicate-of', the set VP. For both subject and predicate, the range is the set S.

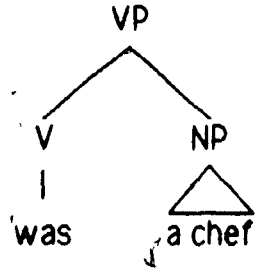
In contrasting syntactic categories with grammatical relations or functions, Chomsky limits his arguments to theoretical ones. But he does not discuss (although he notices) the difficulties one might encounter in providing configurational definitions for all functional relations. Within the domain of sentence grammar, it may be possible to define only the highest functional relations (i.e., those among the immediate constituents of S, subject and predicate) satisfactorily in configurational terms. In order to define other relations, e.g., objects, complements, adjuncts, it seems necessary to state lexical or semantic conditions in addition to the syntactic units involved. For example, it is difficult to distinguish between the direct object of a transitive verb and the predicate nominative complement of 'be' in configurational terms.[6] To illustrate this, I will briefly discuss the structure of the following sentences and the functions of 'be' and 'hit' in conveying information.

13 (a) Steph was a chef.

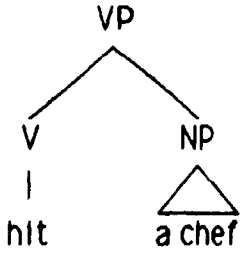
(b) Steph hit a chef.

In traditional analyses, the phrase 'a chef' would be assigned different grammatical functions in these two sentences: "predicate complement" in (a) and "direct object" in (b). Now clearly these functional notions are reducible to structural ones. But the distinction is determined, not only by the configuration, but also in part by the verb selected. If both sentences in 13 have the same hierarchical structures, then 'was' (or its trace) and 'hit' would occupy parallel positions in the predicate phrases.

14 (a)



(b)



[6] Alternatively, the grammar can be modified in seemingly *ad hoc* ways. For instance, to preserve the configurational definition of 'object-of' as [NP,VP], Chomsky (1965: 72) is forced to propose a separate category (copula) in order to exclude 'be' and other linking verbs from the class of transitive verbs. (See 2.2.1 (ii) for a discussion of the analysis of 'be' as a copula.)

If this structural analysis is correct,[7] then the two sentences in 13 would constitute a minimal pair Indeed these sentences would be interpreted differently by competent speakers of English. But what can the difference in meaning be attributed to? Obviously, it is the lexical verb 'be' or 'hit' that is the distinctive surface element in 13[8] For syntax, the important point to notice here is that the internal structure of the NP that is subcategorized and governed by either verb is the same, or potentially the same. The NP may contain specifiers and complements of the same categories Some examples are illustrated here.

15 (a) Steph was a chef who specialized in flans (relative clause)

Steph hit a chef who specialized in flans

(b) Steph was a chef with a sweet tooth (PP complement)

Steph hit a chef with a sweet tooth

(c) Steph was the king's chef (definite possessive modifier)

Steph hit the king's chef

(d) Steph was a very creative chef (indef pre-N modifiers)

Steph hit a very creative chef

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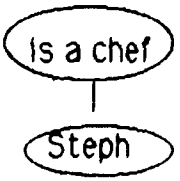
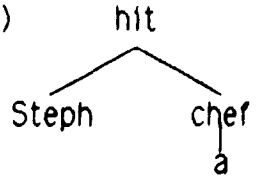
[7] I assume that the predicate phrases containing 'be' and 'hit' followed by a NP both have the same structure, but one might postulate and argue for entirely different hierarchical structures for sentences 13 (a) and (b). For instance, Tesnière's valency structures are compatible with an MPL analysis of 'be + F' and 'hit' as one- and two-place predicates, respectively. Compare the following with 14 (a) and (b) above. These stemmas (his 54 and 6) come from Tesnière (1959: 72, 15)

(i) 

(ii) 

[8] In certain sentence types containing 'be' and 'hit' these verbs do not occupy parallel positions, e.g. with respect to the subject phrase in inverted questions or with respect to 'not' in negative sentences.

(i) Was Steph a chef? (ii) Steph was not a chef:
Did Steph hit a chef? Steph did not hit a chef.

Although the external distribution of certain forms of the verbs 'be' and 'hit' is not exactly the same, these verbs do share other verbal properties. For more details, see 2.2.2.

It appears then that the distinction between the grammatical functions of predicate complement and direct object is based not only on syntactic structure, but also on lexical choice, i.e., on the subcategorizing or governing verb in the VP predicate phrase

If phrases that function as subject, as object, or as predicate complement all have the same internal structure, then why do we posit configurational definitions of these grammatical relations? Postulating a constituent labelled "direct object" and one labelled "subject," both having the same potential structure, would clearly obscure the requirement that these phrases be NPs These NPs simply have a different distribution But NPs are not the only constituents that can function as predicate complements. Thus, the TFL constituent labelled 'term' does not correspond to a single syntactic category, either For this reason it does not signify a precise syntactic notion which could be used to describe syntactic generalizations. Our objective is to establish systematic connections between syntactic structure and conceptual structure.

The important questions for the linguistic analysis of categorical sentences are: What are the systematic connections between syntactic structure and conceptual structure? What systematic connections can be stated for subject-predicate relations? For some linguists, the phrasal categories NP and VP are linked inextricably with the semantic functions of subject and predicate respectively, i.e., as "referring" and "characterizing" expressions (Englebretsen 1981: 84) In this case it would be more appropriate to speak of logical subjects and logical predicates, rather than grammatical ones As a consequence, we would automatically enter the domains of semantics and pragmatics. But there are linguists who would define not only 'subject' and 'predicate' but also 'noun' and 'verb' notionally, i.e., in terms of their denotative functions as in traditional grammar (See, e.g., Lyons 1968: 481)[9]

[9]Aristotle is said to have introduced the notions *subject* and *predicate* as ontological relations, and the terms 'onoma' (noun) and 'rhema' (verb) as word classes and syntactic constituents of sentences (Kahn 1973: 46-47). Informal functional definitions such as the following are frequently found in logic books and grammars: "The subject is what something is being said of. The predicate is what is said of the subject." (Englebretsen 1981: 10; Lyons 1977: 470). Is 'say of' equivalent to 'say about'? If so, these notional definitions are not precise enough to isolate the linguistic phrases that correspond to what is analyzed as grammatical subjects and predicates. Consider the sentence "He painted the barn red." If one now asks, "What did you say about the barn?" the answer cannot be merely "red" or "painted" or even "painted it red." One is forced to repeat the entire sentence in English in order to say what is said about the barn. (This problem is described by Wilson 1924.)

Under these circumstances, to propose a syntactic description in terms of semantic functional notions would be to flout the thesis of autonomy for syntax. Furthermore, if the aim of grammatical analysis is to express systematic correlations between sound and meaning, then using the notions of *subject* and *predicate* (which already presuppose a semantic correlation) in the syntactic description would automatically lead to circularity in our system. I would turn the observation around and argue from the other direction. The functions of referring and of characterizing can only be considered in terms of the use of natural language by speakers in particular contexts. And certainly the semantic (or pragmatic) function of the subject NP (its use by a speaker to refer to something) as opposed to those of the predicate VP (its use to characterize something) are not formal notions. Here it seems that Sommers (1982) and Chomsky (1965: 163) would be in agreement.

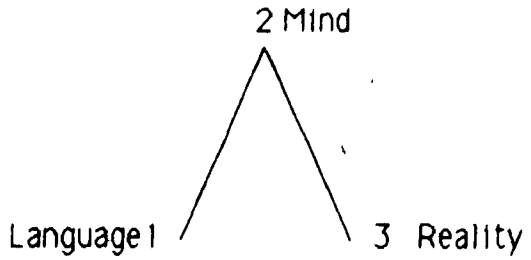
Even though there is often a close correspondence between structural units and the semantic functions of these units, the correspondence is never "perfect," not even between NP and subject and between VP and predicate (Lyons 1977: 438). In fact it is often observed in linguistic literature that no functional relationship between grammatical relations and semantic relations can be one to one. (See e.g., Chomsky 1957: 100, Fillmore 1968: 25; Lyons 1968: 340-341.) Furthermore, any attempt to make such correspondences usually involves a certain artificiality. This would provide another reason for choosing categorial notions and rejecting functional or relational notions as a basis for syntactic descriptions.

On the basis of our examination of the functions of direct object and predicate complement, we see that there is not even a direct correspondence between syntactic structure and grammatical function, much less between syntactic relations and semantic relations. It seems that only principles which refer to syntactic categories determined by distributional criteria (rather than by semantic functions) can capture syntactic generalizations. Structural well-formedness conditions then are best described in terms of categorial units rather than in terms of their relations. Chapter 2 will concern the basic units of syntactic structure that are assumed to be involved in the subject-predicate relations of elementary sentences containing 'be'.

1.2.2 Ontological relations: language, mind, and reality

In general, it is taken for granted, and indeed it has been at least since Aristotle, that what is called here "linguistic semantic competence" involves a relationship between certain elements of language, mind, and reality The elements involved in this relationship are sometimes diagrammed abstractly as points of a triangle.[1]

1 Model of meaning



From this perspective, meaning (or linguistic semantic competence) can be seen as a triadic relation that holds between (1) language (or linguistic expressions), (2) mind (concepts or thoughts) and (3) reality (or whatever it is that speakers talk about). (Points 1 and 3 of the triangle are usually connected by a broken line.) It is often assumed, perhaps naively, that the things that speakers talk about, including all types of concrete and abstract entities, are external, "out there in the real world" (Jackendoff 1983: 26), but that there is no direct relation between expressions and the things they are used to refer to in reality. Rather, a construct such as an Aristotelian or Husserlian *noema*, a Fregean *Sinn*, or a Carnapian *intension* is posited to serve as a link between expressions of a language and reality. Thus the relation of meaning between expressions and reality is effected conceptually, i.e., by concepts that are associated (subconsciously on the part of the speaker) with given expressions. This section will concern the nature of the elements of mind and reality that linguistic expressions are thought to be connected to.

[1] This model is sometimes referred to as "Ullmann's triangle" (e.g., Baldinger 1980: 1-138), or as "Richards' Reference Triangle" (Tondl 1981: 17-19). Ullmann (1962: 55) attributes this "analytical model of meaning" to Ogden and Richards, *The meaning of meaning* (1st ed., 1923).

Jackendoff (1983) inquires into the nature of the objects involved in meaning. He asks specifically, "What is the information conveyed by language?" and "What is the information about?" (Jackendoff 1983: 23) His own response to the first question is similar to the "received opinions" inherited from classical semantics or from traditional logic That is, the information conveyed by linguistic expressions is their sense or intension (abstract mental entities) His response to the second question is different, however. This is the main controversial point that I shall consider in this section. Jackendoff says that the information conveyed by language is not about the real world, as is usually assumed (at least for some topics of discourse). Instead, he claims that speakers talk about their own mental representations in their own private world of experience. Jackendoff (1983. 24) calls this domain the "projected world " He adopts "a metaphysics that embraces four domains: the real world, the projected world, mental information, and linguistic expressions." (Jackendoff 1983: 31). However, he denies that the real world is directly relevant to linguistic semantics. Instead, a projected world extension is substituted for real world extension (Jackendoff 1983 93) Thus his hypothesis would still support a triadic model of meaning. Among the elements represented in a triadic model of meaning-reference, it is point 3, the extension or the referents of expressions, that is the controversial point. At present, I take it that there is no adequate theory that accounts for or even attempts to say exactly what kind of entities expressions actually connect to in speakers' minds or how conceptual structures are related to what (we think) we talk about. But there are interesting hypotheses to consider.

In this section, the questions posed by Jackendoff concerning the information conveyed by language, i.e., its content and what it is about, will be discussed. I will compare and contrast the position taken by Jackendoff (1983) with that of (i) classical semantics derived from Frege (1892) and Carnap (1956), and with that of (ii) traditional logic based on Aristotle and scholasticism. Although I will discuss Jackendoff's position later (iii), it is rightly the focus of the entire section, since it is the only other alternative within the framework of generative grammar that I will examine. I will also consider his criticism of other approaches, especially classical semantics. I have already

stated my preference for an Aristotelian approach in the introduction. Finally my own position concerning the ontological relations between language, mind, and reality will be summarized (iv).

(i) **Classical semantics.** To begin the investigation of the ontological relation among elements of language, mind and reality, I will look at the position that Jackendoff (1983) considers to be "diametrically opposed" to his own. This is the view that is often referred to as "classical semantics."

One of the main problems for classical semantics (as for any approach to semantics) is the choice of constructs for the explication of meaning. Different philosophers, logicians, and linguists of the "classical" school employ different technical terms to designate the elements of mind and the elements of reality that are said to be associated with expressions of natural language. The most general terms are 'meaning' and 'reference' (e.g., Davidson 1967). But both of these terms are ambiguous. For the objects of both the meaning and reference of expressions have been identified as concepts and/or extramental entities. To disambiguate the notion of *meaning*, the following pairs of technical terms have been introduced: 'Sinn' and 'Bedeutung' (Frege 1892), 'intension' and 'extension' (Carnap 1956), 'sense' and 'denotation' (e.g., Linsky 1977).

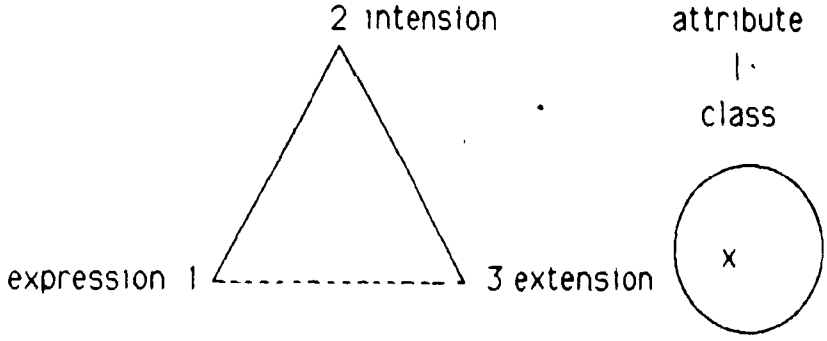
Although these pairs of terms are of course not synonymous, they are used to make distinctions of roughly the same force.[2] For in each pair of terms, the first designates a mental aspect and the second, a material aspect of the meaning-reference relation. The issue here is not whether these terms are synonymous and thus how the various theorists differ from each other. We are interested to see how meaning is characterized in these terms. In this discussion, I will begin with the basic semantic constructs and also the metalanguage of Carnap (1956), as his approach seems to be exemplary of the classical position.

Following Carnap, we can say in short that an expression signifies an attribute and denotes a class. Or, as he observes, a general term designates both an attribute and a class, as illustrated in the

[2] A three-way distinction between *sense, denotation,* and *reference* is clarified by Lyons (1977: ch. 7), among others. See Tondl (1981: ch. 5) for a discussion of the use of these and other semantic terms, including metalinguistic verbs such as 'denote', 'designate', 'express', 'state', etc.

following diagram .The intension (point 2 of the triangle) is simply an attribute (a property or relation)[3] that crucially determines (for competent speakers of human languages) the extension (point 3), i e , the class of extralinguistic entities (concrete or abstract) that is denoted by the linguistic expression (point 1)

1 Carnap's (1956) "Method of intension and extension"



The concept or thought that is associated with the expression (by general convention within a linguistic community) permits competent speakers of the language to use the expression more or less uniformly The extension is the class of all and only those entities that have the attribute (or meet the objective criteria) signified by the expression. The extension is determined by the intension and not the other way around, since an individual may have many different attributes and hence belong to several different classes simultaneously (Tondl 1981: 128). Thus, two expressions with different intensions may have the seme extensions, but two expressions with different extensions could not possibly have the same intension. In general, a given intension should always determine the same class, at least in theory.

Carnap's notions of *intension* and *extension* and Frege's notions of *Sinn* and *Bedeutung* were proposed for the semantic analysis of certain kinds of categorematic expressions. Tondl (1981) points out that while Frege's analysis is founded on the function of the name (a proper name or a definite

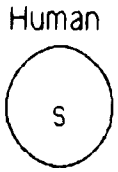
[3] 'Attribute' ('property' or 'relation') are Carnap's (1942) technical terms for 'concept', an expression that is used in logic to denote the abstract object that determines a class. (See, e.g., Whitehead and Russell 1910.) Carnap is said to use the term 'attribute' as a "common denominator" for "property and relation" as well as "individual concept." (Tondl 1981: 123).

description) in predication. Carnap's is founded on the function of the adjective. Carnap (1956: 17) characterizes his notions of *intension* and *extension* using the terms 'property' and 'class' in metalinguistic paraphrases of an atomic sentence. As described in the introduction to 1.2 above, the subject of an atomic sentence must be the name of an individual and the predicate is analyzed as a class, or a collection of individuals that have a certain specified property in common. Consider the atomic sentence in 2.(a):

2. (a) Scott is human.
   (b) Scott has the property Human.
   (c) Scott belongs to (is an element of) the class Human.

Carnap claims that the "translations" 2.(b) and (c) "have the same logical content" as (a), but they are "more explicit." According to this analysis, atomic sentences are taken to be about individuals and the classes they are said to belong to. The relation of an individual (e.g., Scott (s)) belonging to a class (e.g., Human (H)) is formulated in set-theoretic notation as '$s \in H$', and represented using a Venn diagram as follows:

3.



The property and class analysis (intension and extension) is valid also for other categories of general terms. For instance, the denotative function of common nouns is the same as that of adjectives. For an atomic sentence containing a common noun, the same approach would be used:

4. (a) Felix is a cat.
   (b) Felix has the property Cat.
   (c) Felix belongs to (is an element of) the class Cat.

In short, both general nouns and adjectives may designate either attributes or classes. (An interesting question is whether Carnap's or Frege's constructs would be applicable across all the major lexical categories.)

The interpretation of linguistic expressions in classical semantics is an extension-determining process. This process is thought to be compositional.[4] But Carnap characterizes the extensions of different types of expressions differently. The extensions of general nouns and adjectives are analyzed as classes of beings that have the property signified by the expressions, while the extension of a sentence is seen as its truth value (truth or falsity) (Carnap 1956: 26). According to Carnap (1956: 7), the difference in the kinds of extension is related to the ability of different categories of expressions to signify independently.

> Only (declarative) sentences have a (designative) meaning of the highest degree of independence. All other expressions derive what meaning they have from the way in which they contribute to the meaning of the sentences in which they occur. One might perhaps distinguish ... different degrees of independence of this derivative meaning. This order of rank is, of course, highly subjective. And where to make the cut between expressions of no or little independence of meaning ('syncategorematic' in traditional terminology) and those with a high degree of independence, to be taken as designators, seems more or less a matter of convention.

Frege also maintains that a sentence stands for its truth value (Dummett 1981: 180-186). This is one of the ideas from classical semantics that Jackendoff explicitly rejects. He rejects it because of its underlying assumption concerning truth and reality. In order to interpret a sentence, the speaker must know not only the proposition expressed by the sentence but also what the world is actually like. Now I also reject the idea of truth values as the extensions of sentences, but not because

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[4]The principle of compositionality is often ascribed to Frege. It is sometimes referred to as "the Fregean principle" (e.g., Allwood, Andersson and Dahl 1977: 130), although as Cresswell suggests, one should not infer from the name that the principle was ever explicitly stated by Frege. The Fregean principle is formulated by Cresswell (1973: 75) as follows:

> ... The meaning of any complex expression is determined by the meanings of its parts, or to be more precise the meaning of the whole expression is a function of the meanings of its parts ...

The basic principle of compositionality is generally accepted in one version or another by most linguists. The principle as stated here only suggests that the meaning of a sentence is a function of its constituents, but it does not spell out exactly how the meaning of the whole complex expression is connected with the meanings of the individual parts. This is a major task of a formal theory of grammar.

of its connection with truth Rather, it seems that if the extension of a sentence is taken to be what the speaker talks about, then this hypothesis cannot be correct If reference is intentional, as I assume, then only when the speaker talks explicitly about truth or falsity can these abstract entities be included in the extensions of sentences However, this is not to say that the notion of *truth* is completely irrelevant for linguistic semantics

Certain difficulties involving the use of MPL notation to represent the logical forms of natural language sentences were already noted in 1 2 above. Sommers traces some of these back to basic doctrines of classical semantics, e g , the MPL analysis of atomic sentences as basic forms, the doctrine of the asymmetry of subject and predicate denotative functions Other problems can mostly be summarized simply as violations of a constraint on semantic theory that Jackendoff (1983 13-16) calls the "Grammatical Constraint " The major obstacle in applying MPL to linguistic semantic analysis is the insensitivity of the system to the nature and structure of natural language (See, e g , Jackendoff 1983 57-59.) But the notational problems do not necessarily invalidate the semantic constructs of *intension* and *extension* for the analysis of language

Jackendoff does not argue explicitly against the Carnapian notion of *intension* or Fregean *Sinn* Thus, he appears to accept these classical notions However, he could not consistently agree with them in all respects The main distinction between Jackendoff's notion of *sense* and *intension* and those of Frege and Carnap seems to be their psychological character For Jackendoff, and most theorists it seems, the sense of an expression is understood as a mental entity Frege and Carnap, "however, rebelled against this 'psychologism', as they termed it." For them, and their followers, a concept that determines the extension of an expression is an objective abstract phenomenon As a public property, it is theoretically available to be grasped by all speakers of a language. Nevertheless, it is conceded that in order to grasp an intension or sense, a speaker must come "to be in a certain psychological or mental state " (Putnam 1975. 218) This step seems necessary to make the classical view of *sense* compatible with Jackendoff's

The fundamental notions of *intension* and *extension* (or their equivalents) are assumed in set-theoretic and model-theoretic approaches to semantics Carnap's notions are also reformulated in

a "possible worlds" version In this approach, the intension of a word, say 'tiger' is a function f defined on all possible worlds whose value f(x) at any possible world is always a subset of the entities in x All of these methods of analysis are explicitly rejected by Jackendoff (1983 78, n 3, 251), primarily on the basis of their underlying assumptions concerning truth and reality Although Jackendoff does not deny that expressions of language have both an intension and an extension, it seems clear that his characterizations of these notions would not coincide with Carnap's For Jackendoff, an intension is the conceptual content of an expression and the extension is taken to be what the expression is about He would consider a statement such as the following to be irrelevant to semantic analysis "The expression 'tiger' is true of an entity e in a possible world x if and only if e belongs to the set t(x) "It would be irrelevant because it contains at least four notions that are irrelevant *set*, *necessary and sufficient conditions*, *possible worlds* (which comprehends reality) and *truth* Concerning truth and reality, see my comments in 1 2 3 Now, I will consider the other notions in turn First, I will question the wisdom of rejecting outright the notions of *set* and *class*[5] For the analysis of certain kinds of sentences, it seems that they are completely defensible For instance, *class* would seem reasonable for the analysis of quantified expressions in universal categorical sentences of the following types

5 (a) All tigers are cats

(b) No victims were children

Surely these sentences can be plausibly analyzed as propositions concerning two classes of individuals. But there are problems in conceiving of the extensions of all expressions in terms of sets or classes of objects For instance, there are abstract nouns, e.g., 'wisdom', 'love', sincerity', and mass terms, e.g, 'rice', 'sand', 'water', that cannot be analyzed as classes of individuals For the semantic analysis of non-count nouns, another conception of extension is required Here the possible worlds version of the theory does not answer either To see this, consider whether the intension of 'water' can

[5]Jackendoff's rejection of sets or classes seems inconsistent to me in view of his conceptual analysis of 'be' as a function BE (x,y) On the common extensional interpretation, most mathematicians would take a function to be an ordered pair (of sets or classes) in a certain relation

be defined as a function on all possible worlds whose value f (x) at any possible world is a subset of the entities in x The units of water are not subsets, they do not collectively form a class of water or H_2O[6]

Putnam's criticism of classical semantics. Another aspect of the classical notion of *intension* that Jackendoff opposes is that it is said to provide necessary and sufficient conditions Other thinkers, e g , Putnam (1974 ch 12) have also argued in considerable detail against this account of lexical meaning I will now briefly discuss Putnam's arguments against intensions as the exclusive determiners of extensions and his own alternative proposal Putnam's ideas are relevant since Jackendoff adopts a semantic analysis that is similar to Putnam's, although he would not accept all of Putnam's conclusions either

For Carnap, intension is "simply a *property* " Putnam scorns the fact that the notion of *property* must be taken as primitive. "An entity e belongs to the extension of a term T just in case e has whichever property is the intension of T " (Putnam 1975 263) But 'property' here, he notes, is just another term for 'concept' that is supposed to provide a necessary and sufficient condition Putnam objects to necessary and sufficient conditions especially in the context of Carnap's "method of verification "

> For philosopher's like Carnap, who accepted the verifiability theory of meaning, the concepts corresponding to a term provided . a *criterion* for belonging to the extension (not just in the sense of 'necessary and sufficient condition', but in the strong sense of *way of recognizing* if a given thing falls into the extension or not)

Putnam examines natural kind terms, which he describes as indexical expressions whose extensions are not always verifiable by the ordinary speaker, but sometimes only by experts Thus, he recognizes a "social dimension of cognition" which he calls the "division of linguistic labour " He also

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[6]Ter Meulen (1984: 421) proposes an analysis of mass terms using "typed intensional logic with the usual set-theoretic interpretation." For her, the intensions and extensions of both count nouns and mass nouns are properties and sets of basic entities, respectively. But she distinguishes between nominal mass terms and predicative mass terms which she claims have different denotations The extension of the former (e.g., 'gold' in 'gold is an element') is an abstract entity called a "substance," while the extension of the latter (e.g., 'gold' in 'my tooth is filled with gold') is "a set of quantities of the substance." Her proposal merits careful consideration.

recognizes the "contribution of the environment" in his account of how speakers associate semantic markers and extensions of natural kind terms.

Putnam himself proposes a "normal form description of the meaning of a word" that contains two types of semantic information: semantic markers and stereotypes. His semantic analysis of the word 'water' is a vector consisting of syntactic markers, semantic markers, stereotype information, and a description of the extension

Syntactic markers	Semantic markers	Stereotype	Extension
mass noun	natural kind	colorless	H_2O
concrete	liquid	transparent	
		tasteless	
		etc	

Putnam (1975 269) claims that these are the essential elements of meaning "in any scientifically interesting sense." The semantic constructs called "semantic markers" (necessary conditions) and "stereotypes" were inspired by Katz and Fodor's original (1963) notions of *semantic markers* and *distinguishers* (Putnam 1975 266-269). Given his own account of meaning, Putnam ultimately accepts the classical claim that "meaning determines extension." In this case, meaning is not, however, characterized in terms of a Carnapian intension (Putnam 1975 270). In contradistinction, Putnam claims that the conceptual analysis of an expression need not always provide a necessary and sufficient condition, although he does allow that certain criteria are necessary. He attempts to specify the kinds of semantic information that are essential. However, Putnam (1975 270-271) also criticizes the view of classical semantics in other respects. For instance, he concludes that classical semanticists have tended "to treat cognition as a purely *individual* matter, and . . to ignore the *world*, insofar as it consists of more than the individual's 'observations'." He says, "although we have to use a *description* of the extension to *give* the extension, we think of the component in question as being the *extension* (the *set*), not the description of the extension."

It appears then that Jackendoff's semantic hypothesis is "diametrically opposed," as he says, to classical semantics in terms of both intensional and extensional relations. Although he considers

linguistic expressions to have an intension and an extension, these constructs for him are not the same as those of classical semantics, as practiced by either Carnap or by Putnam Jackendoff's proposal concerning the information that language conveys conforms more to Putnam's "normal form description" than to a Fregean *Sinn* or a Carnapian *intension* That is, as Putnam (1975) argues, the conceptual constituents associated with expressions involve only necessary conditions (essential properties) and stereotypes As for extensions, however, Jackendoff and Putnam have different ideas For Putnam, like Frege and Carnap, accepts the notion that "categorematic" lexical items denote sets and classes and that some of these belong to the real world.

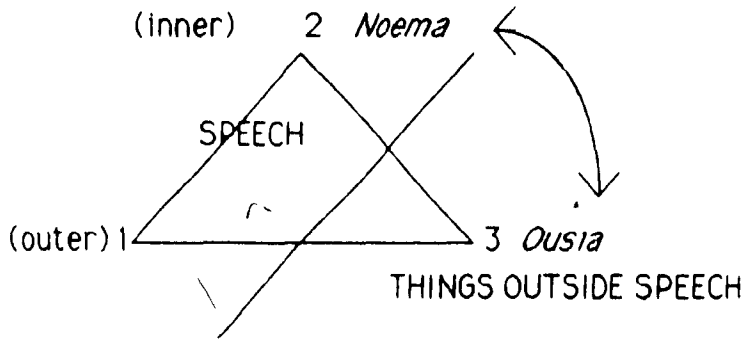
(ii) Aristotelian logic and its tradition. In this section, I will consider some of Aristotle's notions concerning language taken from his works on logic and ontology The works that are most relevant to my investigation of categorical sentences are *The Categories* (on the logic of terms), *De Interpretatione* and *Topics* (on the logic of propositions) and his ontological work the *Metaphysics*. It is not my intention to review any one of these vital works in detail or even to summarize them in the context of his comprehensive philosophical system My purpose is simply to introduce Aristotle's notion of *category* and related ideas, from which one can extract his position concerning the relationship between language, mind and reality Although not all of the views presented here were necessarily stated explicitly by Aristotle, they have developed within traditional formal logic (TFL) based on his works [7]

Language, mind, and reality. Logic in the Aristotelian tradition is directed towards the study of language and thought, which are taken to be inextricably interconnected. Thus, in TFL, as in a mentalist theory of language, when one studies the structure of language, one necessarily studies the structure of thought. The domain of TFL, as outlined by Nuchelmans (1980: 202), is twofold

[7]The TFL position is the one that most influences my approach to the analysis of categorical sentences. My most important sources on Aristotle and the criticism and commentaries on his works include Ackrill (1963), Arens (1984), Bambrough (1963), Frede (1981), Kahn (1973), Kirwan (1971), Nuchelmans (1973, 1980), Sommers (1982).

(i) *Logica organica* "is concerned with the mental conceptions that are involved in the activities of definition, classification, argumentation and methodical arrangement." (ii) *Logica thematica* is concerned with questions relating to "the subject-matter of thought," i.e., "the general nature of the things about which knowledge is sought ." According to Nuchelmans, this distinction "is strongly reminiscent of the old Aristotelian distinction" between *logos* ("inner or outer speech")[8] and *pragmata* ("things outside thought and language"). This two-way subdivision of the domain of traditional logic suggests a different way of looking at the relationships between language, mind, and reality I will diagram them using the triangle as follows

1 Domain of traditional formal logic (TFL)



Aristotle apparently held this view (*De Interpretatione* 1 2). As interpreted by Arens (1984 26), linguistic expressions are

> . symbols, i.e., signs, signals, ... of what is in the soul or mind as an impression or concept. ... Here it is best called an impression from the outside, which, seen from the inside is an imagination or a concept: this is the exact word, for 'conceive' is 'receive' or 'get pregnant' and also 'form in the mind', 'think' and 'concept' is the thing conceived as well as the notion. That is how we have to understand 'pathema', which Aristotle does not explain: a percept coupled with a notion, which depends on experience and memory, as when one perceives a very peculiar sort of building and registers at once, as the result of a simultaneous act of abstraction, 'palace' or 'chapel', etc., or when one sees something rapidly moving: 'a running child' or 'a dog is running', etc.--these are the onomata (subject terms) and rhemata and sentences as pathemata of the soul or mind, and in general they presuppose or are simultaneous with, the corresponding words.

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[8] J. A. Fodor (1975) expresses a similar idea: "the language of thought."

In this view, concepts are representations or signs. They do not represent themselves, however They are directed toward other things This is an essential (defining) characteristic of a system of representation The representational character of concepts should help to explain how they are conceived as mediating the relations of denotation and reference between expressions and the things that speakers talk about [9] This view contrasts with Jackendoff's approach which denies the direct relevance of things external to mind and thought for categorization

It is a difficult to extract either a theory of language and mind or a theory of ontology from Aristotle's works The difficulty stems from the fact that Aristotle discusses language, mind and reality all at the same time It is true that Aristotle treats the ambiguity of 'being' as an expression and *being* as a concept in the same passages Furthermore, according to Bambrough (1963 33), Aristotle leaves the reader with the impression that he assumes "a fairly straightforward correspondence" not only between language and thought, but also "between the structure of his language" (which we now call "ancient Greek") and the "structure of the world " From the viewpoint of MPL, a stronger point of criticism would be the following "Aristotle may have allowed himself to be influenced too much by linguistic descriptions" in his ontological inquiry (Bambrough 1963 35) Against this possible criticism, however, Aristotle says (*Metaphysics* Book 7, ch 4) that his concern is to discover "actual facts" rather than just what we "should say" about things. Yet the treatises on the logic of terms and the logic of propositions, the *Categories* and *De Interpretatione*, which are based on linguistic observations, manifest a preoccupation with ontological questions. On the other hand, in this very inquiry into metaphysics, Aristotle focuses on the verb 'einai' and its

[9] In this dissertation, I will not enter into the debate concerning the epistemological priority of the elements of language, mind, and reality. Arens (1984) reviews the question of the relation between words and concepts in commentaries on Aristotle. According to him, Abelard, e.g., maintains that "words are invented to signify notions" or the "causa inventionis vocis" is concepts. (Arens 1984: 234). This seems highly plausible to me. And here we also have the possibility that the world can influence conceptualization. In classical semantics, the ordering of (2) intensions and (3) extensions is considered to be crucial. Actually in TFL (or a mentalist theory of language) one need not separate expressions and concepts since they are taken to be closely connected. In the context of a linguistic analysis, however, language seems to be the appropriate element to take as the point of departure for postulating conceptual structures associated with expressions.

derivative 'ousia' or 'being' in general. 'Ousia' (an abstract noun derived from the Greek verb 'einai' ('be')), he claims (*Metaphysics* Book 5, ch. 7), is used in many and various ways

In short, Aristotle makes definite claims about both the form and content of sentences In *De Interpretatione* he outlines the formal subject-predicate requirements for propositions (as discussed in 1 2 1) and makes a claim concerning the priority of statements in this form Furthermore, he states that the propositional content of all sentences which may be appropriately assigned truth values (truth or falsity) can be characterized as the attribution of properties to a substance (or ousia) Aristotle claims that whatever speakers can talk about in the world must be either itself a substance (or ousia) or an attribute of one He further assumes that the ousia and the attributes ascribed to them can be ultimately subdivided into a limited number of ontological categories

One of the complications of the Aristotelian *category* is that it has a conceptual aspect and a material aspect. Each instance of a given type of substance is conceived as a "composite" of <u>form</u> and <u>matter</u> All of the instances of a particular type of ousia have the same <u>form</u> (character), but the <u>matter</u> of each individual instance of a type exists separately According to Aristotle, "form is the nature of the thing itself" and not an entity apart from the particular that instantiates it Here Aristotle disagrees in part with Plato, who postulated separate Forms embodying the universal properties of things Aristotle does not deny the existence of properties, only their existence apart from individual substances. Thus it seems he does not give up all of the notions of Plato. Of a thing's form and matter, only the form is conceivable. "The particular individual thing is the only independently existing substance, knowing something about it (its properties) is knowing something that is <u>universal</u>." (Bambrough 1963: 136; the emphasis is mine).

The ultimate purpose of Aristotle's theory of categories is seen in many different ways Aristotelian scholars claim variously that the ten categories are intended as a classification of (1) linguistic expressions, (2) concepts, and/or (3) things in the world. But most would deny that Aristotle was "confused" as to what he was investigating. That is, it seems clear that Aristotle makes the distinctions between language, logic, and the world when it is necessary to discern the distinct features of each one. Some scholars (e.g., Bambrough 1963, Frede 1981) conjecture that Aristotle

would describe his own metaphysical work as ontological, rather than linguistic or logical But as Bambrough (1963: 36) writes: "there is little to lose or gain by understanding his work in any one of these three ways rather than in any other. The structure is the same whether we think of it as linguistic, logical or ontological" More importantly, it is not inconceivable that the same list of categories is equally applicable in linguistic analysis, logic and ontology, as Frede (1981) suggests

Ontological categories in linguistic analysis. According to Aristotle (*Categories* 1b 25), the categories are designated by "things said without combination," i e , terms uttered in isolation. (Thus, in contradistinction to Carnap, Aristotle holds that not only propositions, but also the categorematic expressions analyzed as terms have independent meaning.) Aristotle identifies the ten categories in two lists

From *Categories* (1, 5), the list of ten categories is translated as: what (or Substance), how large (i e., Quantity), what sort of thing (i e , Quality), related to what (or Relation), where (i e , Place), when (or Time), in what attitude (Posture, Position), how circumstanced (State or Condition), how active, what doing (or Action), how passive, what suffering (Affection).

From *Topics* (1, 9), the list of ten categories is translated as. essence, quantity, quality, relation, place, time, position, state, activity, passivity

Aristotle's categories are thus genera or classes of terms. He claims that each and every subject and predicate term belongs to one or other of the ten categories. The subject term must however belong to the first category.

For many Aristotelian scholars, the "first category" presents a puzzle. It is the only category that has a completely different name in the two lists. As suggested by Frede (1981), this discrepancy may be related to the orientation of the treatises in which the lists are given. The first list is taken from the *Categories*, a treatise on the logic of terms taken in isolation; the second list is from *Topics*, a treatise on the logic of categorical propositions, each of which contain two terms. Although Aristotle claims that the ten-way classification applies to both subject and predicate terms, in fact, the first list is based on an analysis of predicate terms in isolation. Aristotle claims that each predicate term

that could be applied to an individual term such as 'Socrates', 'this', or 'that' in elementary sentences must belong to one of the ten categories

The following are Aristotle's examples "in outline" translated from the *Categories*

2 (i) Substance 'a man', 'a horse'

(ii) Quantity 'two cubits long', 'three cubits in length'

(iii) Quality 'white', 'grammatical'

(iv) Relation 'half', 'double', 'greater'

(v) Place 'in the market place', 'in the Lyceum'

(vi) Time 'yesterday', 'last year'

(vii) Posture 'is lying', 'sitting'

(viii) State 'is shod', 'is armed'

(ix) Action 'cuts', 'burns'

(x) Affection 'is cut', 'is burnt'

The grammatical subject of a predication names an entity that can belong to one (and only one) category, substance [10] While each substance has a form, "not all substances have the same form"

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[10] The ontological category of substance (essence or being) is perhaps too general to be useful in linguistic semantic analysis. It includes whatever one can talk about as the subject of a categorical sentence. In this case, Aristotle may indeed have allowed himself to be too much influenced by language. Yet an important objective of his metaphysical inquiry was to search for what could be considered primary among the different kinds of substances. He settled on concrete organisms such as man and horse, as examples of the primary substance. (See examples 2 (i) above.) Aristotle said that what is most properly taken as a substance is what is neither asserted of a subject nor present in a subject, as he explains in *Categories 5*. Linguistic evidence is used as part of the argument here.

> .. But we do speak of secondary substances, which include the species of the primary substances, and their genera. For instance, a particular human is included in the species "human," and the species itself is included in the genus "animal" Things such as "human" and "animal" are spoken of as secondary substances. . . From what we have said it is plain that the name and definition of the predicates can both be affirmed of the subjects. ... Everything else but primary substance is either affirmed of primary substance, or present in it. This is evident from particular instances taken by way of examples. We predicate 'animal' of human beings. So we predicate 'animal' also of any particular human. Were there no individuals existing of whom it could thus be affirmed, it could not be affirmed of the species. ... If, therefore, there were no primary substances, nothing else would exist.

(Bambrough 1963. 25, 29). In other words, Aristotle recognizes many different types of substances Any subject term whatsoever (whatever one can talk about as the subject of a categorical sentence, which amounts to whatever can be named) belongs to the category of substance. Substance is therefore a very general category. But the predicate term may belong to any one of the ten categories For the sentences in 3, the predicate terms may belong to the categories indicated in parenthesis Since Aristotle has named ten categories, there must be at least ten basic types of substances, corresponding to each of the categories, i.e., if the categories are mutually exclusive In some cases, however, two or more categories seem plausible for the classification of the predicate terms

3 (i) All tigers are animals. (secondary substance)

(ii) The sky is blue. (quality)
Blue is a colour (secondary substance)
Honesty is a virtue. (secondary substance)

(iii) Its weight is four kilos. (quantity)

(iv) The ice cream is in the freezer. (place)
Cleanliness is next to goodness. (relation, location?)

(v) The concert is at 8 p.m. (time)
Spring is here. (time, place?)

(vi) Arens was his teacher. (relation)

(vii) The kestrel is standing on one foot. (position, activity?)

(viii) The violet is healthy. (condition)

(ix) The clock is striking one. (activity)

(x) Steph is being insulted. (passivity)

But Aristotle himself writes, "...if one and the same thing is in fact both qualitative and relational, there is nothing strange about its being counted in both classes." (*Categories* 8 B 148). Aristotle's scheme of categorization is sometimes criticized as an attempt to provide an exhaustive list of the types of terms (i.e., categorematic expressions of a language). For this purpose, it is considered to be inadequate (e.g., Bambrough 1963: 133). Ryle (1953: 292) also wonders whether or not there is any

justification for a belief in such a limited list of ontological categories as was maintained by the scholastics.[11]

My purpose here is not to evaluate Aristotle's list of ten categories, i.e., to determine whether or not it is adequate for linguistic analysis or for logic or ontology. As I stated in the introduction, the important question concerning the ontological categorization scheme is its significance for linguistic description and explanation. Two different ways to use the notions of the categories are suggested in the two lists: first to classify terms in isolation; second, to compare terms of different types that are combined in predications From a conceptual viewpoint, what sorts of combinations of terms are permitted? As an example of the terms in isolation, the most obvious significance of the categorization scheme derives from Aristotle's own presentation of the list of categories in the first place. That is, one of his first observations relating to language and ontology is the correlation between his categories and question ('wh'-) words and phrases He could be addressing the following questions. "What kinds of questions can be asked about the things that are in the world?" and "What kinds of answers are appropriate to such questions?" (Bambrough 1963 23-24) Interrogative words in sentences signal information gaps, as linguists well know Aristotle relates each of his categories to a question word or phrase that would be answered only by a subject or predicate term that belongs to the appropriate ontological category (*Topics* I, 9). I shall use this technique of analysis in 5.2.2

Another use of the categories is based on the combination of terms It is now time to consider the first category as an essence or being, which suggests a wider scope than the more concrete notion of *substance* (By the term 'essence' here I understand something like "what a being is by its nature.") This is the name of the first category in the second list which occurs in *Topics* I, a treatise on predication. In *Topics* I 4-5, Aristotle identifies and defines four ways of combining terms to form propositions. The types of predication based on the relation of the predicate term to the subject are called (i) property, (ii) definition, (iii) genus, or (iv) accident. A definition is a phrase that

[11]A similar claim concerning a finite number of major ontological categories is stated explicitly by Jackendoff 1983: 56.

indicates the essence of something Aristotle analyzes 'That which is seemly is beautiful' as a definition A property is something that belongs to the referent of the subject alone and is predicated convertibly of it For example, 'A human being is capable of learning grammar ' 'Whatever is capable of learning grammar is a human being' A genus is that which is predicable in the category of essence of several things which differ in kind, e g., a man, a bird and an ox are all members of the genus animal Finally, an accident is something which can belong to any one particular thing or not In *Topics* (I 8), Aristotle suggests that the type of predication can be deduced on the basis of a combination of the two features of essentiality and convertibility, as follows Definition [+convertible, +essential], Property [+convertible, - essential], Genus [-convertible, +essential], and Accident [-convertible, -essential] The properties of essentiality and convertibility of predicates can only be determined by considering predicates in combination with subjects, although these properties could not be stated for things said in isolation

Although Aristotle considers some kinds of things to be more properly substances than others (see note 10 above), he observes that we may make the same kinds of predications about all kinds of essences Notice, for example, that terms belonging to any one of the ten categories may also function as the subject of a categorical sentence In some cases, the form of the predicate expression must be modified (nominalized) in order for it to function as a subject in English. In any case we should always be able to predicate a definition, a property, a genus, or an accident of any substance (or essence), whether concrete or abstract. Thus there should be ten varieties of essential being as determined by the categories (*Metaphysics* 5, 7) (The roman numeral indicates the category illustrated)

4 (i) A horse is an object.

(ii) Three cubits is a quantity

(iii) Grammaticality is a quality of sentences.

(iv) Her mother is her only living relative.

(v) A good place to read is (in) the library.

(vi) Last year was the best time of my life.

(vii) Hanging on a nail is the position of your hat

(viii) Being broke is his usual financial state

(ix) To cut wood is an action

(x) Being cut is an affection

Aristotle's main point seems to be that the same principles of predication (linking or combination of terms) apply equally to phrases containing all types of terms, regardless of their inherent category of being. That is, a predication of a definition, a property, a genus, or an accident may apply to an entity that belongs essentially to any type of substance.

There is another use of the categories based on the combination of terms. Sommers first used the notion of *category* to explain predicability, i.e., the applicability of a predicate term to a subject term. The problem of predicability or category mistakes is discussed in linguistic literature as "selectional restrictions." Clearly this is a matter that belongs to the domain of the conceptual well-formedness rules and it is relevant to the cognitive process of categorization as well as the linguistic process of predication. In category mistakes (e.g., 'the ideas are green'), the extension of the subject term 'ideas' falls outside the category, i.e., the range of the predicate term 'green' and its contrary 'non-green'. According to Sommers (1982: 299-306), all members of the category determined by the properties *green* and *non-green* must have the feature or attribute that is designated by the English expression 'coloured'. In any case, a *category* for Sommers is really a type of predicate, and thus would belong to one or another of Aristotle's ten categories. Although this notion of *category* (as the range of a predicate and its complement) may be explanatory in dealing with category mistakes, it seems too broad to use as a basis for explaining how speakers can interpret category-correct sentences. The truth conditions of predications must be stated in terms that are just as specific as the expressions contained in the sentences analyzed. If we assume a two-valued truth system, then the domain of truth must include an extension similar to the one described as an ordinary set versus its

complement, as in axiomatic set theory By the law of the "excluded middle," category mistakes would always be false (For more details, see Sommers 1963, 1965, 1971, 1982. ch 13)[12]

Aristotle's theory of categories has the effect of subdividing the expressions of a natural language into two semantic classes which some philosophers and logicians label 'categoremata' and 'syncategoremata' According to Alston (1964 14, n 7), the term 'syncategoremata'

> was introduced by medieval logicians to apply to words like conjunctions which were regarded as not standing for anything and so as not having meaning 'in isolation' These were the linguistic . units that were left over after one had gone through everything that could be assigned to Aristotle's ten "categories," a classification of terms made by Aristotle. Thus, the remnants were . used only *with* (*syn*-categorematic) the categories

The categories provide a criterion for the distinction which linguists make between "lexical" words and "function" words Such a distinction should not be taken to imply that syncategoremata or function

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[12]Let us examine the notion of *category* as the union of contrary predicate terms P and P' or P and non-P Contrary predicate terms would belong to one and the same category which could be determined by a superordinate predicate. For this reason, Sommers' *category* is unsuitable as a construct to account for the interpretation of category correct sentences in terms of *truth* To illustrate this, for the following sentences,

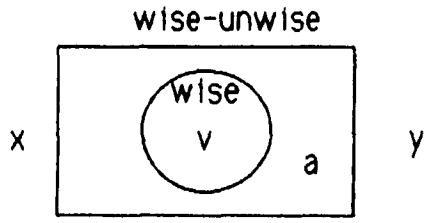
(i) Victoria is wise. (ii) Albert is unwise

Victoria and Albert would belong to the same category that is determined by the properties *wise* and *unwise*. In set theory, an individual is said to be either a member of a set or not to be a member of this set. Let 'v' stand for Victoria and 'a' for Albert. Either v and/or a is/are included in the set determined by the predicate term 'wise' or else in the complement set, which includes everything that is not wise. If sentences (i) and (ii) are true, they might be represented as follows

(i) wise (ii) unwise

In contrast, Sommers' category might be represented as follows.

(iii)



If Victoria were wise, then in the representation (iii), 'v' would fall within the circle labelled 'wise'; if Abel were unwise, then 'a' would fall outside the circle, but still within the box labelled 'wise-unwise'. With respect to being wise, presumably one is or one is not, but being wise or unwise is simply not relevant to (or not predicable of) whatever falls outside the box (x or y).

words are meaningless, however, as is sometimes suggested Crystal (1980 156), e g , distinguishes between these word classes by saying that lexical words have "semantic content," which presumably function words lack This is not quite correct, in my view, since both classes of words have semantic content by definition, i e , if a word is a lexeme, defined roughly as a unit correlating sound and meaning Rather, categoremata have semantic content independently of phrases or clauses, which syncategoremata lack in isolation

According to an Aristotelian subject-predicate analysis, categorematic expressions (ones that belong to an ontological category) function as terms We observe that categoremata correspond to certain classes of syntactic categories For instance, the categorematic expressions which may function as predicate terms of 'be' in English are the maximal projections of exactly (all and only) the major (lexical) categories, i e , N, A, V, and P For sentences consisting of the surface sequence [NP be XP], the phrases NP and XP in the unmarked cases both belong to one or another ontological category The fact that categoremata have both an intensional and an extensional aspect of meaning may suggest semantic well-formedness conditions on sentences containing 'be' For instance, well-formedness conditions based on predicability (ontological fit) will ensure against category mistakes

It seems that the categorization scheme outlined by Aristotle is basic Since it is so fundamental, surely the categories of individual lexical items need be represented only once in conceptual structure They could operate in meaning postulates or redundancy rules The notion of *category* (as a finite class of predicate types) may be used to account for the semantic interpretation of subject and predicate terms and also for predication, i e , the subject-predicate relations of categorical sentences Sommers (1982 301) analyzes subject-predicate relations as instances of "category inclusion," or more precisely, as type inclusion He says that for a natural predication, the type denoted by the subject term is included in the type denoted by the predicate term The correspondence rule that I shall propose in Chapter 3 to account for the interpretation of a categorical sentence follows the same lines. The referent of the subject belongs to the type(s) denoted by the predicate term. Types are not limited to classes of individuals but include the denotata of abstract and mass terms as well The condition of belonging to a type can also be used to account for the

mass terms as well The condition of belonging to a type can also be used to account for the inferential relations between the premisses and conclusions of logical arguments, as I shall demonstrate in 5 2 3

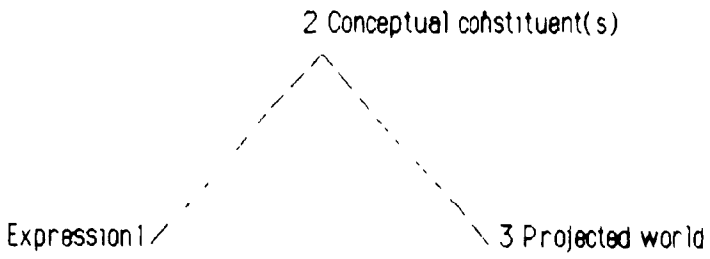
(iii) Jackendoff's Projected World Many semanticists accept the assumption that meaning involves a relation between language, mind and reality, as diagrammed in 1 2 2 above However, one element of this relation is being challenged by Jackendoff He questions "the centrality to natural language semantics of the notions of truth and reference as traditionally conceived " (Jackendoff 1983 29) He explicitly rejects several approaches to semantics that assume 'a fixed pre-established connection of truth between sentences and the real world " (1983 78, 251, n 3) Rather, he claims that speakers cannot refer to things in the real world, [1] but only to things in a world of experience that he calls "the projected world " (Jackendoff 1983 31)

Substituting a "projected world extension for real world extension," Jackendoff can still claim, as he does, that conceptual structures determine the extensions of linguistic expressions, or as he says (1983 93), "sense still determines reference " Except for his objections to truth and necessary and sufficient conditions, Jackendoff does not criticize Frege's notion of *Sinn* or Carnap's notion of *intension* (Jackendoff 1983 23) Characterizing sense as *conceptual constituents*, Jackendoff (1983 36) writes "the information that language conveys, the *sense* of linguistic expressions, consists of expressions of conceptual structure " Thus the main disagreement between Jackendoff's conceptualist theory and a "classical" semantic theory is the "projected" world versus "real" world extension For Jackendoff (1983 17), reference is a relation that holds between two mental representations or between two levels of conceptual structure (which is defined as "mental representation") For him, meaning and/or reference still involve only two integral relations, not

[1] Jackendoff admits the existence of reality but denies that speakers can actually experience it or talk about things "out there." There is an assumption underlying this theoretical stance that I find difficult to assimilate. That is, theorists (scientists, too) can talk about reality, affirming that it exists or not, but speakers cannot talk about things in the real world. I assume otherwise. That is, ordinary speakers can do anything with language that theorists can do Theorists are just ordinary speakers with specialized interests and knowledge about certain topics.

three Thus, Jackendoff's model of reference may also be represented as a triangle I shall represent it as follows

1 Jackendoff's reference triangle



He uses the following notation linguistic expressions are enclosed in quotation marks, e g , "be", conceptual constituents are written in all capital letters within brackets, e g , [STATE], and sharp signs enclose projected world entities, e g , #state of affairs in the world# Jackendoff assumes a close connection between expressions of a language and expressions of conceptual structure, e.g , "be" and [BE], and also a connection between thought and whatever it is that speakers refer to, e g , their own projected state of affairs

I will now investigate the nature of the projected world that Jackendoff posits as the domain of linguistic reference. Then I will examine the assumptions underlying the claim that speakers' can only refer to entities, states and events of the projected world and not to those of the real world I will discuss these in the context of the psychological reality of linguistic semantics (I will propose an alternative ontological position in 1 2.2 (iv) and discuss truth and reference in 1 2 3)

Questions concerning the projected world. Jackendoff's specification of what the projected world is not like is more explicit than what it is like He asserts that the projected world representation is not like a Carnapian extension, or a classical denotation, i e., it is not the set or class of all and only those extralinguistic entities that have the property designated by a given expression Jackendoff's projected world is also not equivalent to "possible worlds," one of which is the real world (Jackendoff 1983. 251, n 3) Then what is it? Jackendoff (1983· 34) writes

> the projected world is made up not of brain states, but of experiences, and no one seems to have any idea what experience is, nor how configurations of brain states are transmuted into it by the mechanism of projection

As the extension of conceptual structures, the entities in Jackendoff's projected world are mental representations of the things, events, states of affairs, etc , that speakers experience or that enter into their conscious awareness (1983 28-29) For Jackendoff, the information that language conveys is about the projected world "The *referring expressions* of natural language will be just those expressions that map into projectable expressions of conceptual structure " (Jackendoff 1983 36) (The nature of the conceptual structures that are projectable or not will be discussed in 1 3 1)

How is communication between different speakers possible? It seems curious and, in a way counterintuitive, to posit a subjective theoretical construct such as the projected world to help explain how communication between different speakers is possible Such a construct would seem more apt to support the contrary hypothesis that communication between individual speakers is impossible Jackendoff argues, however, as follows In the characterization of the projected world, the following properties are coupled while they are subjective, varying from speaker to speaker, they are uniquely determined by conceptual structures, which are themselves determined by an innate system of conceptual well-formedness rules (Jackendoff 1983 19) On the other hand, if projected world extensions were determined jointly by input from the the real world that speakers could experience and conceptual structures, then the variability of referents would seem highly plausible But according to Jackendoff (1983. 29) it is impossible for speakers to experience the real world directly

Next, let us consider some other properties of projected world representations For instance, Jackendoff (1983. 93) writes. ". . projected world #entities# are mental constructs isomorphic to a subset of conceptual structures " As seen in the triadic diagrams presented in 1 2 2, the relationship of meaning subdivides into two integral relations. (I) the connection between expressions of a language and thought, and (II) the connection between thought and whatever it is that speakers refer to and talk about It might be argued, however, that these two integral relations are not parallel. One might expect

the connection between language and mind to be close but find between mind and the (extralinguistic) world a gap or chasm For sure, the connection between language (L) and mind (M) would seem to be more direct than the connection between mind and reality (R), as illustrated here

2

This gap, echoing Aristotle's distinction between *logos* and *pragma* (Nuchelmans 1980 202), makes sense in view of the "mentalist" conception of language (e g , Chomsky 1975, Fodor 1975) On the other side, neither a strictly mentalist nor a lingualist conception of reality seems supportable For the sentence,

3 There are three tables in the foyer

containing seven lexical items, there are probably at least seven different concepts But a corresponding state of affairs should not directly involve seven objects, only four, one foyer containing three tables Moreover, these seven expressions associated with the same seven concepts may be used to refer to any situation involving three tables in a foyer Thus an isomorphism between linguistic expressions and concepts seems justified and is thoroughly consistent with a mentalist view of language But there can be no isomorphism between conceptual structures and the things talked about Whatever speakers talk about seems to exist apart from or be truly external to language and thought Furthermore, the same expressions (and the corresponding concepts) may be used over and over again by the same speaker and others to refer to many similar situations In any case, for the purpose of interpreting sentences of a language, it is assumed, again perhaps naively, that the intensions of expressions are sufficient to determine their referents, involving things and their external states outside language and mind. It is this indirect relation with reality that is most difficult

to account for Perhaps Jackendoff postulates the domain of the projected world to account ultimately for this indirect relation However, he does not explicitly attempt to link the projected world and reality

Psychological reality. Jackendoff's "central concern," he says, is "human linguistic and cognitive ability" and he insists on keeping semantics within "the domain of psychology " He observes that speakers are programmed to talk about things and to experience them as though they were "out there in the real world " (Jackendoff 1983 26) This is why he postulates that speakers construct a projected world representation In Jackendoff's psychologically-oriented theory of language, the immediate objects of speakers' acts of reference are characterized as mental entities Moreover, these projected world representations are subjective, varying from speaker to speaker according to their experiences In this perspective, understanding and communication are possible since the "innate processes" by which different speakers construct their projected world representations are the same, according to Jackendoff (1983 30)

Many of Jackendoff's observations concerning the speaker's psychological relations with the environment seem plausible to me I do, however, find his notion of the projected world as the domain of linguistic reference to be questionable Yet it is not clear how one could demonstrate its incorrectness That may depend on biological or neurological evidence In what follows, I will simply offer the reasons for my skepticism concerning the projected world as the domain of linguistic reference

Jackendoff's observations are probably correct concerning speakers' use of language "as though" the objects of reference were "out there in the real world." Perhaps it is also correct to say that speakers are "programmed" to do this If so, then theorists can only describe the world speakers are "programmed" to talk about. Then for a conceptual account of language it does not matter whether speakers refer to the projected world or to the real world, unless our hypothesis makes a claim about the relation between concepts and the domain of reference

But let us suppose that speakers really do talk about things in the projected world For instance, it is possible that speakers do, exactly as Jackendoff postulates, construct a "projected world" representation as the extension of expressions If so, then a key question is, as Carlson (1985 514) suggests, whether Jackendoff's projected world might not have a function in a theory of the (real) world It seems to me that the most plausible function of a projected world domain would be to serve as a link between an expression of conceptual structure and any extralinguistic entity which the expression might be said to determine in the real world or in the world outside language and thought From this perspective, the projected world is possibly but one point in a whole series of points in the mapping between conceptual structures and the entities that speakers may refer to in the real world The end point could, however, be extralinguistic or reality itself It seems to me that Jackendoff does not really argue convincingly for the projected world representation as the end point of semantic mappings Even if the projected world were the end point in semantic mappings, it would still be interesting to discover how it relates to the real world The problem would be to determine the properties of the projected world that make it an essential ingredient in the link between conceptual structures and reality But since we need only one referent or one set of referents for a particular utterance of a given expression anyway, to avoid unnecessary reduplication, we might as well go ahead and take the projected world as the real one Since this is exactly what speakers do anyway, according to the hypothesis, taking the projected world and the real world as one and the same would make our hypothesis "psychologically real" (But paradoxically, if Jackendoff's claims are correct, this "psychologically real" hypothesis would be incorrect) Should we not still prefer a "psychologically real" hypothesis?

The following questions remain unanswered How does the projected world domain affect linguistic semantic competence? What is the import of the experienced world for a description of language and mind?

Alternative ontological position. For anyone adopting a mentalist or conceptualist semantic theory, the easiest way out would probably be to claim ontological neutrality That is, it is

tempting to posit an abstract extensional construct, without making any ontological commitment concerning "possible," "projected," or "real" world entities Jackendoff does, however, make an ontological commitment concerning the sorts of things speakers talk about He limits the domain of reference to the projected world and excludes the real world (1983 ch 2) This offers the seemingly attractive feature of presenting a unified account of the interpretation of sentences about various kinds of phenomena [19] But the desire to present a uniform analysis is, I think, misguided It leads to a search for analogous representations for entities of all types images, improbable or impossible states, abstract entities as well as concrete physical objects and events or states in the real world In order to provide a completely uniform account of the interpretation of sentences about various kinds of phenomena, it is necessary to ignore the character of the phenomena talked about But the character of the things that speakers talk about is not irrelevant, neither for categorization nor for linguistic analysis

In sum, Jackendoff's position seems to be wholly mentalist That is, he maintains that both sense and reference are representational Clearly the conceptual sphere is essential for an account of linguistic semantic competence, but to postulate two levels of mental representation seems excessive In contradistinction, I will argue that only sense is conceptual (internal to the mind) but that the domain of reference is external As least the latter is conceived as extramental As Jackendoff observes, speakers always talk as though the objects they refer to are external He claims that we are programmed to do this. But clearly his hypothesis concerning the "projected world" (the level of mental representation which is said to be the domain of reference) does not explain why speakers conceive of the things they talk about as external. In other words, I think that Jackendoff has correctly observed an interesting fact, but his "projected world" is not a mechanism that would readily account for it Furthermore, having reference also as a level of mental representation detracts from the central function of conceptual structure as hypothesized by Jackendoff (1983 17)

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[19] The projected world approach shares this feature with some versions of "possible worlds" Whether speakers talk about unicorns, mountains, or numbers, they are said to refer to a mental object (cf. Cresswell 1983)

My comments here have been strictly limited to the projected world domain In 1 3 1, I shall examine Jackendoff's (1983) conceptual analysis of elementary sentences containing 'be'

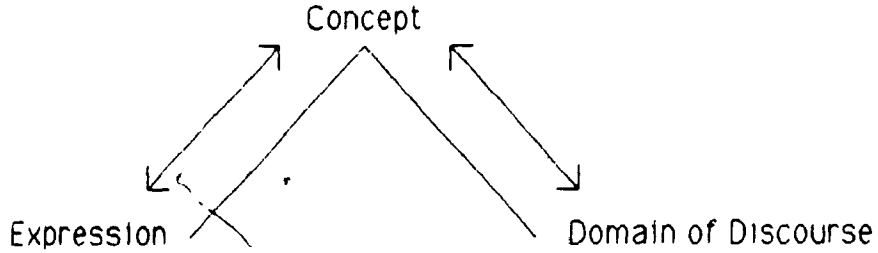
(iv) Statement of my ontological position. The model of the linguistic system and conceptual structures of the mind that I will assume in this work is diagrammed in 1 1 It was proposed by Jackendoff (1983 21) I will also assume his "Conceptual Structure hypothesis" (1983 17), which postulates a "single level of mental representation at which linguistic, sensory and motor information are compatible " One can, however, accept this hypothesis and at the same time maintain different assumptions concerning the nature of conceptual structures and the domain of reference The ontological position that I assume is much more moderate (naive and realistic) than Jackendoff's However Jackendoff's model would not preclude the possibility that speakers do, at least sometimes, refer to things in the real world In fact, his conceptual hypothesis would allow for the "contribution of the world" to the process of interpreting certain types of expressions (natural kind terms) about things in the world, as suggested by Putnam (1975) Moreover, it seems to me that Jackendoff's model (designed to explain how speakers can talk about what they see) should also permit speakers actually to use what they can see to form concepts In this way, we might say that the mind could employ information from the world in conceptualization This would be a reasonable assumption, given that the concepts associated with some expressions seem to concern entities that actually may exist in the real world and their attributes anyway

By assuming only one level of mental representation (conceptual structure), I wish to emphasize its role in determining the extensions of linguistic expressions On my view, it is not necessary to give up all of the traditional views concerning sense and reference An important distinction between these domains is clearly expressed by Carnap, who contrasts the notions of intension and extension Sense is intensional, and reference is extensional Perhaps speakers conceive of the entities they talk about as external to their minds because they <u>actually are</u> extramental. Basically, I would claim that our view of the world is determined by the way the world is structured The world, in this perspective, includes human beings and our minds, which, like

everything else in the world, have their own essential structure Our view of the world is determined jointly by the structure of the mind and by the essence of the things perceived by the senses and/or conceived by the mind

To ensure successful communication among speakers of a human language, it would seem that the relevant ontological relations must meet certain prerequisites For instance, the integral relations illustrated in the triadic model of meaning, (i) the relation between expressions and concepts, and (ii) the relation between concepts and their extensions in the domain of discourse, must presumably be objective, at least to a certain extent

1 Model of meaning and conceptualization



Certainly for the speakers of a particular language, the correspondence between expressions and concepts and the consequent correspondence between concepts and the entities talked about can only be objective or intersubjective Otherwise, language would fail as a system for the expression of thoughts about things in the world that speakers seem to experience in a similar way. The objectivity or intersubjectivity of the ontological relations among expressions, concepts, and entities in the domain of discourse would also be compatible with Jackendoff's model of the linguistic system and conceptual structures. In fact, Jackendoff argues that all human beings are so structured that they are capable of forming the same concepts. It is even claimed that some concepts are universal (Jackendoff 1983 56). I do not question the claim that our ways of apprehending the world are constrained by conceptual structures, the senses, etc. Nor do I deny that speakers may form their own private images of things and situations (cf Frege's notion of *Vorstellung* or *idea* (Smith and McIntyre 1982: 67-68)). I attempt to argue, however, that speakers do not ordinarily and systematically refer to their own private mental states when they talk about the things they can see. (Although this point seems to

be central to Jackendoff's account of how we talk about what we see, I do not feel that it is crucial for the semantic analysis that I propose in this work)

The ontological position that I wish to support is somewhere between two extremes I find neither the view that whatever is denoted by linguistic expressions must exist in the real world nor the view that linguistic expressions cannot be used to refer to the real world acceptable The referents of linguistic expressions (the things speakers talk about) are not limited to a single type that could be characterized exclusively as entities that "exist in reality," as is sometimes assumed in classical semantics (discussed, e g , by Linsky 1977), or exclusively as entities that are experienced in a mental "projected world" as assumed by Jackendoff I would argue that human beings are not limited to a single domain of reference or experience As a consequence, speakers can refer to a variety of types of things In other words, the domain of reference is actually not homogeneous Any homogeneity that could be ascribed to it is applicable only in theory, i e , indicated by theoretical terms such as 'referent' or 'extension' Put another way, there exists no single homogeneous type which includes all things that speakers can refer to and talk about. Or, there is no single property such that it applies to all types of things that speakers can talk about (except perhaps the metalinguistic notion of *referent*.) Along the same lines, Moravcsik (1975 49) remarks " there is no way of specifying the domain of discourse, it includes everything " Ryle (1953. 294) observes that "there is no one name for all the significata of expressions which would be of the same type " This makes the same claim in conceptual terms

The problem is to find a definitive way to support one's claims concerning the domain of reference? I will offer a demonstration based on the notion of predicability

Although clearly the conceptual sphere is important, it cannot be all that is involved in the semantics of natural language Human conceptual structure no doubt determines (to a certain extent) how we see and also how we talk about things in the world, but from this fact, can one deduce that speakers actually talk about their own mental representations? Is it possible that all things "out there" are only conceived as structured? The actual structure of things might also contribute something to the structure that we ascribe to them In any case, an "ontological" system cannot be

entirely conceptual and not at all dependent upon or even related to the real world.[20] A study of ontological classes seems relevant to a semantics of natural language only if it is ultimately seen to involve the relations between linguistic expressions that speakers use and the things they (believe they) talk about. This relation, which is arbitrary and indirect, is generally taken to be established conceptually. If one assumes that meaning and reference involve a triadic relationship among expressions, concepts and referents, and if referents of expressions are determined exclusively by conceptual structures, then clearly the conceptual representation of an expression must contain some necessary criterial information concerning whatever it is that the expression can be used to refer to. Ultimately then, the real world cannot be irrelevant for the meaning/reference relation since it does supply at least some of the objects that speakers refer to and at least some of their properties, as convincingly argued by Putnam (1975, ch. 12). Thus the real world may well be directly involved in setting some of the conceptual constraints reflected in language, e.g., predicability. Different things are conceived as having various and sundry properties. This is reflected in sentences that speakers find sayable (e.g., category-correct sentences) as opposed to those that are not sayable (e.g., sentences containing category mistakes).

Taking reference as an intentional (conscious) act on the part of speakers, I will now argue that speakers do not refer, as Jackendoff claims, to internal objects (projected world representations) when they talk about things that they perceive to be in the real world. If this is so, then it is doubtful that speakers refer systematically to the projected world in each and every act of reference, regardless of the ontological category of the referent(s). If speakers actually referred to their own internal projected world representations rather than to various kinds of external phenomena, then individual speakers would always be referring to the same kinds of entities, i.e., mental ones. As a consequence they should be able to ascribe to all entities they refer to properties that belong to the

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[20] Sommers presents an ontology in a "contemporary perspective," which involves the relation between language, mind and reality, but he (1982, 305) is critical of Quine's view of ontology, which he says is just a description of "what there is" materially. (See, e.g., Quine 1948.) Surely it is just as much an error to view ontology as a wholly mental categorization scheme in the abstract. There is an incompleteness to either a wholly conceptual or a wholly materialist approach.

same category or type This is not possible As a rule, speakers are aware of the ontological types of the entities they refer to and they select predicate terms that express properties that are appropriate (category-correct) to ascribe to them Let us consider some elementary sentences containing 'be'

2 (a) My notion of this balloon is red (?)

This balloon is red

(b) My notion of this balloon is a snake (?)

This balloon is a snake (It forms a snake)

(c) My notion of this balloon is clear/sharp/vivid/fuzzy

This balloon is clear (transparent?)

This balloon is sharp (like a knife or other physical object?)

This balloon is vivid (a vivid colour?)

Notice, first of all, it is possible to talk about mental objects But, based on the sayable versus unsayable sentences, we clearly conceive of mental objects as belonging to a different ontological type from physical objects, such as balloons The properties that we attribute to notions in ordinary sentences do not belong to the same types or categories as those that are attributable to what would seem to be real world objects Concrete objects such as balloons have colour and shape (form) features, which mental objects lack However, if speakers were only able to refer to projected world representations as Jackendoff claims and not ultimately to real world entities, then the pairs of sentences in 2 (a) and (b) should be synonymous But competent speakers of English would not take these sentence pairs to be synonymous Their truth conditions are not the same, and furthermore, the truth value of the second sentences of each pair, but not the first ones, can be calculated publicly in concrete situations and verified by many speakers In contrast, the vocabulary of predicate terms that are applicable to mental objects seems to be extremely limited by comparison Furthermore, the properties denoted by the expressions 'clear', 'sharp', 'vivid', 'fuzzy', etc, would be equally attributable to our representations, notions, images, etc., of anything, be it concrete or abstract, real or imaginary

3 This representation of a frog/logarithm/food processor/
cake walk/avalanche/tree house is unclear

These predicate terms may also apply to concrete physical objects But the interpretation of 'clear','sharp', 'fuzzy' is different when these expressions are applied to subjects that denote physical objects, such as 'this balloon' That is, when these terms are predicated of physical objects they denote physical properties On the other hand, the purely physical properties do not apply to mental objects I take this demonstration to illustrate the facts that (i) speakers may talk about a variety of objects that are conceived as belonging to different types, and (ii) mental representations and concrete objects are conceived as different types of entities Taking reference as an intentional (conscious) act, I think it is clear that speakers do not systematically refer to a "projected world" (or to mental) representations or concepts, especially when they talk about ordinary things such as balloons that may actually exist in the real world. In sum, I assume that speakers know what they are talking about Speakers talk about all kinds of things and they know that these things belong to various types or categories, not just to a single category of mental entities This is part of linguistic semantic competence

I am willing to accept the demonstration based on predicability just presented as conclusive However, it assumes that predicability (i.e, sentences that are sayable or not because of the applicability of predicates to entities) provides evidence for the kinds of entities that speakers intend to refer to But the mentalist hypothesis claims only that language provides evidence for conceptual structures, not necessarily for the structure of the objects of reference. The sentences in 2 above could be taken as expressions that convey our conceptions of things. We cannot conclude from predicability that the objects of reference actually are as they are conceived. In fact, Jackendoff could argue that predicability proves his hypothesis concerning the relation between language and reality, or rather between speakers and reality

Without conclusive arguments or evidence for the real domain of reference I am content to adopt a more naive position concerning the ontological relations between language, mind and reality Since this is the view that corresponds to the speaker's, I consider it to be the most efficient one for the analysis of natural language within a theory of linguistic competence The exact nature of the actual domain of reference is not essential for the conceptual analysis of language

1 2.3 Truth and reference

In the following passage, Jackendoff (1983 29) rejects what he takes to be the traditional notions of *truth* and *reference*

> Truth is generally regarded as a relationship between a certain subset of sentences (the true ones) and the real world, reference is regarded as a relationship between expressions in a language and things in the real world that these expressions refer to Having rejected the direct connection of the real world to language, we should not take these notions as starting points for a theory of meaning .

As these notions are characterized in this quotation, Jackendoff is perhaps justified in rejecting them for an account of linguistic meaning. However, I find the characterization of both *truth* or *reference* (as these concepts are employed traditionally) to be misleading here Jackendoff seems to imply that *truth* and *reference* are relationships that are taken by other theorists to hold directly between expressions and things or situations in the real world But these relationships are generally taken to be mediated by a mental construct such as *sense* or *intension* Furthermore, the relationship that he calls "reference," defined as a relationship between expressions and things, is sometimes called "denotation " This is only one aspect of the meaning relation, as traditionally described Chomsky's distinction between linguistic competence and linguistic performance (1965 3-15) could be used to distinguish between the notions of *denotation* and *reference* It is essentially a distinction between what a speaker knows (competence) and what a speaker does (performance). (For a discussion of the notions of *sense, denotation* and *reference* in the classical sense, see Linsky 1977, Lyons 1977 ch 7, Tondl 1981 ch 5.)

There are also two different conceptions of reference: (i) reference conceived in terms of intrinsic (referential or denoting) properties of expressions and (ii) reference conceived as part of a speech act. The first is characterized as "référence virtuelle," the second, as "référence actuelle" (Kleiber 1981 419)

Actual reference involves a conscious human act by which language is related to entities in an extralinguistic world of discourse This agrees with the description of reference as (part of) a "speech act." (Searle 1979: 55). Thus, actual reference is intentional on the part of the speaker From the perspective of the semantics-pragmatics dichotomy, one might argue that actual reference (described by Jackendoff as "a relationship between expressions and the real world") belongs to the domain of language use, while potential reference is equated with denotation or "sens dénotatif" (Kleiber 1981: 19) In either case, the referents of expressions are normally considered to belong to their denotations or extensions. Actual reference pertains to utterances on particular occasions. It involves a relationship between speakers and the situations in which they use sentences of natural language. Actual reference, however, presupposes denotation. That is, only certain kinds of expressions (categoremata) may be used by speakers to effect a relation of reference. For a general expression, classical semanticists claim that the denotation is a class of entities that have a certain property designated by the expression. (See 1.2.2 (1).) Potential reference, like denotation, involves a subconscious (on the part of the speaker) conceptual association between language and the types of entities that meet the conditions signified by the categorematic expressions of a language.

Speakers use expressions of language to refer to whatever they choose to talk about in a domain of discourse, although they may also refer in a vague or opaque way The entities that speakers talk about are by no means limited to things that exist in the real world (as in 1 (a) below), and speakers may refer in an indefinite way, without knowledge of exactly who or what the referent actually is (as in 1 (b) or (c) below).

1 (a) Pegasus is a winged horse.

(b) The robber is wanted by the FBI.

(c) The director wanted to hire an experienced secretary.

Next, let us consider the notion of *truth* One of Jackendoff's arguments against truth is based on the vagueness of categorization resulting in uncertain "judgments" He says (1983 78) that the actual truth values of sentences expressing categorization judgments are of no concern to us Here we agree Yet he says our account of the categorization process should allow for a three-way distribution of judgments yes/no/not sure or "don't know" (Jackendoff 1983 102-103) Speakers' judgments vary concerning the propositions expressed by the following sentences But these sentences, he says, "are not objectively true or false in the real world" (Jackendoff 1983 102)

2 (a) A piano is a percussion instrument

(b) The American Sign system is a language

(c) An abortion is a murder

The first problem to notice is this "Yes," "no," and "Don't know" or "not sure" are responses to different kinds of questions. "Yes" and "no" are an affirmation or denial of a categorization judgment They concern whether or not a particular (type of) thing belongs to another type or types "Don't know" and "not sure" concern the speaker's knowledge, which is a different topic of inquiry

Considering the types of sentences available for the expression of category judgments, it is clear that only two types of judgments are expressible, one positive, the other negative That is, for any elementary sentence which relates any entity of a certain type to another type or category , the judgment expressed must be either affirmative or negative For the possible judgments in 2 concerning pianos and percussion instruments, a sign system and language, abortion and murder, there is no verb in English contrasting with 'be', e g , that expresses an ambivalent categorization Of course, positive or negative categorization judgments may be modified by the use of models or expressions such as 'possible', 'impossible', etc But these modifications are always directed toward positive or negative judgments. In contrast, the phrases 'not sure' or 'don't know' do not express judgments at all, but rather abstention from judgment This is not to suggest that 'not sure' and 'don't-know' are incorrect answers to categorization questions To the contrary, a speaker may simply not know whether or not something belongs to a particular type or category Since, as Jackendoff argues,

neither types nor tokens are taken to be finite (Jackendoff 1983 83), no speaker is expected to be able to make judgments concerning all tokens with respect to all types In the present investigation, I shall focus on the expression of categorization judgments, rather than on the problems of vagueness in categorization, or on the truth value of judgments These problems concern the speaker's use of language rather than the structure of the language itself, I believe

For his cognitive theory, Jackendoff does not see a need for the metatheoretical notion of *truth* Nevertheless, when it comes to applying any semantic theory to the analysis of sentences of a particular language, it will be necessary sooner or later to deal with the concept of ordinary *truth* Although this is a different problem, there are categorical sentence types that are uttered by ordinary speakers of English in which this concept is explicitly expressed

3 (a) These truths are self-evident
(b) This is true
(d) No, it is not true
(e) This is a universal truth

How would these sentences be analyzed within a semantic theory that does not have access to the notion of *truth*? By the guiding principle of expressiveness (Jackendoff 1983 11), truth simply cannot be ignored by an adequate theory of semantics for natural language.

It seems especially strange to deny that truth is relevant to semantics while asserting at the same time that a semantic theory must account for "so-called 'semantic properties' such as . 'valid inference' " (Jackendoff 1983 11) Inference involves the transmission of truth among propositions On what other basis could one sentence be taken as a conclusion (q) that follows from its premisses (p)?

4 (p) Martine is a tiger
(q) Martine is a cat.

5 (p) Martine is violet
(p) Martine is a planet
(q) Martine is a violet planet

The notion of *valid inference* as a relation between propositions presupposes the truth of prior propositions, according to Ewing (1963 165) "In order to infer q from p, an *a priori* proposition, namely *if p then q* must be necessarily true and not just postulated or arbitrarily fixed by convention " No deductive system could function without some *a priori* propositions of this kind because one could not infer anything without them (I shall return to the subject of inferential relations between sentences in 5.2 3)

The outright rejection of *truth* seems to be too drastic a move The whole subject is far more complex than implied by Jackendoff's description quoted above For one thing, he does not make a distinction between *truth conditions* and *truth values* As I conceive of these aspects of truth, truth *conditions* would belong to the domain of linguistic semantics, while the truth *values* of contingent sentences would only have relevance in pragmatics (and in most fields of scientific research, including linguistics and psychology, let us hope)

I do agree with Jackendoff, however, in the following respect For linguistic analysis, the actual truth values that could be assigned to utterances are irrelevant (In Aristotelian terms, truth or falsity would be considered an "accidental" quality of most declarative sentence types) This is so, since sentences are not the bearers of truth values, propositions are (See footnote 1, Introduction) To see the distinction, let us consider the following sentence types

6 (a) I am hungry.

(b) John is hungry.

(c) The soldiers are hungry

What are the truth values of these sentences? Strictly speaking, on their own as linguistic objects abstracted away from a context of utterance, they are truth valueless. Their truth values are context-dependent This is because there are gaps in the propositions that the sentences in 6 express These gaps are created by the use of indexical expressions The referents of indexical expressions, such as the pronoun 'I', common proper names such as 'John', definite descriptions and tensed copulas are indeterminate outside of a context of utterance. Until the referents of the "referring" expressions

were determined, a speaker would be unable to compare the information conveyed by the sentences with states of affairs in the world (or in their projected world) in order to judge whether they were true or false However, theorists who focus on linguistic semantics need not worry about claims actually made about states of affairs in any particular domain of discourse

Although most sentences (linguistic objects) are not the bearers of truth values as illustrated in 6 above, clearly they are the bearers of "propositional content" This holds even for sentences containing indexical expressions Heuristically the propositional content of a sentence may be taken as a statement of its truth conditions. In theories of meaning based on truth, the meaning of a sentence is said to be its truth conditions (Kempson 1977 ch. 3) This is just another way of conceiving of the phenomenon that is called the "sense" or "intension" of linguistic expressions If so, then truth conditions are relevant for linguistic semantics Linguistic semantics is not concerned with the proposition as the bearer of truth values, but only with the part of the proposition that is unchangeable from one context to the next From this standpoint any speaker who understands a sentence could be said to know what the world would be like if the proposition expressed by the sentence were true (Allwood, Andersson and Dahl 1977 72) (At this point, it is not a question of the ontological status of the domain of reference, whether imaginary, possible, projected or real) The truth conditions of a sentence must be grasped by a competent speaker as a prerequisite for determining its truth value More important, for my purposes, is the fact that the truth conditions of a sentence must be grasped by a speaker as a precondition for interpretation

Speakers are not expected to be able to state the truth conditions of a sentence any more than they could be expected to state its sense or the grammatical rule used in constructing a phrase or sentence In general, I would maintain only that speakers' ability to make judgments about the truth value of sentences depends on their ability to interpret the sentences and their having a certain knowledge about the states of affairs being talked about. But given their knowledge of the truth conditions of expressions, speakers are able to make hypothetical judgments concerning the truth values of sentences. To be more specific, as Cresswell (1978) argues, what a speaker is able to say about some sentence types with respect to truth is the following. Given two sentences A and B, if A is

true and B is true, then they are possible paraphrases But if A were true and B were false, then they could not possibly have the same meaning. This kind of judgment would seem to be a reliable source of information about speakers' intuitive semantic competence. Such judgments could be made independently of a particular semantic or linguistic analysis

It seems to me that there is little to be gained by ignoring the notion of *truth conditions* in linguistic semantics. Without adopting a truth-based theory of meaning, one can use the notion of truth, where it applies, to test claims about meaning relations between sentences The main advantage of using truth is that it provides an objective criterion for determining meaning relations, independently of any particular conceptual analysis or linguistic theory.

The compositional interpretive process has the effect of relating the expressions of language to entities in the domain of discourse. As I noted above, speakers may refer to and talk about a variety of types of things. The domain of discourse is often the real world (reality), but it may also be an imagined or fictional world or even a conceptual world. The ontological status of the actual referents in the domain of discourse is a pragmatic factor

In this work, I will make a strict methodological distinction between grammatical, semantic and pragmatic factors. Grammatical factors are formal or structural, either morphophonological or syntactic. Semantic factors involve speakers' semantic competence, i.e., tacit knowledge of the conceptual structure of linguistic expressions. Pragmatic factors involve performance and derive from the speaker's participation in a particular speech act that occurs on a particular occasion The analysis presented in this work will focus on the grammatical and semantic aspects of sentences containing 'be'. It will concern the intensions and extensions of linguistic expressions, but not their actual referent(s) or the truth values of propositions. To be more precise, when I use the terms 'refer' or 'actually refer', 'actual referent', 'actual reference', etc., in this work, I will have in mind their sense in the context of speech acts, i.e., intentional acts on the part of speakers. Otherwise, the terms 'referent', 'reference' will be used to indicate potential referents or reference. Notice, however, that while I do not attempt to account for actual reference here, the phenomena that I do consider must be presupposed by a theory of reference. That is, for a speaker to use an expression

referentially, the expression must have as a precondition a conceptual structure that determines its extension. If the expression truly applies, its extension includes the actual referent(s) intended by the speaker. Actual reference depends on pragmatic factors My thesis will examine the systematic preconditions of expressions that speakers may use to refer to things These will be examined in abstraction from the contextual factors and empirical situations that provide the settings for speech acts.

1.3 Alternative semantic analyses of categorical sentences within generative grammar

The semantic analyses of elementary sentences containing 'be' that have been proposed within generative grammar over the past twenty years subdivide roughly into two groups: those that consider 'be' to be univocal and those that consider it to be multivocal. My analysis belongs to the first group. Thus my proposal contrasts with the thesis of Higgins (1979), who highlights the ambiguity of copular sentences. He identifies four different types of subject-predicate structure for English sentences containing 'be': identificational, identity, predicational and specificational. Earlier Plötz (1969) described the different semantic relations expressed by simple copular sentences in English More specifically, he discusses the membership relation, some pseudo-membership relations, the naming relation, the identity relation, the inclusion relation, the whole-part inclusion relation His thesis is a search for a "semantically oriented syntax," i.e., different syntactic structures that correspond to these semantic differences.

The analysis of elementary sentences containing 'be' that I propose in this work owes much to previous studies of 'be'. For instance, *Foundations of Language* has a supplementary series of monographs entitled *The verb 'be' and its synonyms;* the volumes in this series alone cover an entire library shelf. Although many of these studies are relevant to my research project, it would be impossible to review all of them. A work in this series that has provided useful insights concerning 'be' in English as well as in the language of Aristotle is Kahn's (1973) study of '*einai*' in ancient

Greek It is a model of interdisciplinary scholarship, which combines the methods of Greek philology and the conceptual analysis of philosophical semantics Kahn seeks an explanatory synthesis of the massive data contained in texts of ancient Greek First, he sorts out the different classes of "uses" of this verb in sentences He rigorously defines the different "uses" in terms of sentence forms or basic syntactic structure according to the transformational theory of Zellig Harris Kahn wonders why a single verb serves as the "copula" and also, among other uses, "as an expression of existence," noting that there is no separate verb meaning "to exist" in Greek Among the different "uses" of the same verb, Kahn assigns priority to the predicative structures, this priority being based on the literary significance, prominence, and frequency of occurrence in the texts examined. This leads him to argue for the conceptual unity of the different uses of 'einai' in ancient Greek He further hypothesizes "that the diversity of uses for the verb 'be' in Indo-European languages is more than a historical accident it represents a cluster of concepts whose interconnections are of permanent importance" (Kahn 1973a 3)

Although Kahn claims that the predicative use of 'be' is primary, he does not actually give an explicit conceptual analysis of the verb in this use Kahn (1973), Higgins (1979), and others seem to assume an intuitive understanding of the notion I agree with the claim concerning the priority of the predicative use of 'be' I therefore believe that it is precisely this sense of 'be' which must be explicated

This section offers a brief critique of some recent alternative analyses of sentences containing 'be' within generative grammar As for the more recent works within generative grammar, I have been especially influenced by the works of Gruber (1976) and Jackendoff (1976, 1983) In particular, like Gruber and Jackendoff, I argue for a uniform lexical (morphosyntactic and semantic) analysis of 'be' However, my uniform conceptual analysis of 'be' differs from those of Gruber and Jackendoff First, in 1 3 1, I will discuss the treatment of the cognitive processes of individuation and categorization by Jackendoff (1983). Then in 1 3 2, I will examine the literature on the analysis of 'be' in terms of semantic roles and the hypothesis of thematic relations, as proposed by Gruber and Jackendoff

1.3.1 Jackendoff's conceptual analysis of 'be' and its functional arguments

In 1 1 and in 1 2.2 (iii), I reviewed some of the general claims and theoretical assumptions of Jackendoff (1983) I have adopted his model of the linguistic system and conceptual structures, as well as other assumptions and techniques of analysis. Although I do not agree that the "projected world" (or, the individual speaker's private representational world of experience) should be taken invariably as the object of all acts of reference, I do not consider this issue to be crucial to the linguistic semantic analysis of elementary sentences containing 'be'.

What is crucial for this purpose within a mentalist theory of language is the conceptual analysis of linguistic expressions. In this section, I will focus on specific elements of Jackendoff's conceptual analysis of elementary sentences containing the verb 'be'. In particular, I will discuss the conceptual structures, constructs and distinctions that Jackendoff would take to be essential to use as a basis for an account of the cognitive process of categorization Here I shall briefly review the main sources of dissimilarity between his position and mine, and attempt to explain why I reject certain aspects of his proposal. The following topics will be discussed: (i) Jackendoff's analysis of 'be' as a function BE (x,y), and (ii) his type-token distinctions between the conceptual constituents that correspond to the major phrasal constituents that co-occur with 'be' in well formed sentences.

Jackendoff presents an analysis of sentences containing the verb 'be' in the context of describing the cognitive processes of individuation and categorization. These are the subjects of Chapters 3 and 4-5, respectively, of his *Semantics and cognition* (1983) There he defines categorization as "the ability ... to judge that a particular thing is or is not an instance of a particular category." (p. 77). Certain sentence types are based on and reflect the speaker's ability to make categorization judgments. Such judgments are typically expressed by sentences of the following type (1(a), represented in MPL notation as in 1 (b)).

1 (a) Felicia is a tiger.

(b) Tf

In 1 (b) the predicate constant 'T' stands for "is a tiger" (which contains the general term 'tiger') and the individual constant 'f' stands for "Felicia," the name of an individual. As Jackendoff explains, categorization is a basic cognitive process that must also be ascribed to organisms other than humans. Furthermore, even human categorization judgments can be made "independently of the use of language." In fact, in order to interpret some sentences, it is necessary for speakers to use information obtained through non-linguistic modes or by means of one or more of the senses. For example, linguistic information is certainly insufficient for verifying or for making judgments concerning the propositions that are expressed by sentences containing indexical expressions.

2 (a) This is Felicia.

(b) That was a skunk.

(c) This is cut velvet.

(d) This is a flowery orange pecoe.

Jackendoff emphasizes that his interest in categorization does not concern whether or not "a particular categorization is true, but what information and processing must be ascribed to an organism to account for its categorization judgements." According to him, categorization judgments must be based on prior representation (1983: 78). He claims, furthermore, that "once a theory of cognition has sufficient formal power to account for non-linguistic categorization," it should be able then to account naturally for other important creative processes such as "linguistic inference" (Jackendoff 1983: x).

Let us examine Jackendoff's representation of the conceptual constituents on which a categorization judgment is based. He suggests the following representation for the sentence type in 1 (a) (Jackendoff 1983: 80).

3. $$\left[\begin{array}{l}\text{STATE TOKEN} \\ \text{IS AN INSTANCE OF } \left(\left[\begin{array}{l}\text{THING TOKEN} \\ \text{FELICIA}\end{array}\right], \left[\begin{array}{l}\text{THING TYPE} \\ \text{TIGER}\end{array}\right]\right)\end{array}\right]$$

In Jackendoff's analysis, the verb 'be' is treated as a function "whose argument places are filled by strictly subcategorized syntactic categories " For the sentence in 1 (a), the two arguments correspond to the NPs that function as the subject and predicate complement of 'be' The verb 'be' thus maps into a function BE (x,y) that compares two relata What BE compares are representations of the thing being categorized, Felicia in this case, and the type of thing Felicia is said to be The function BE maps two arguments into a conceptual constituent that belongs to the major ontological category that Jackendoff calls "[STATE TOKEN] "

As for the relation between syntactic structure and conceptual structure, Jackendoff (1983 67) proposes an interesting principle of referentiality concerning the levels of phrase structure and sentence structure. He claims that

> every major phrasal constituent in the syntax of a sentence corresponds to a conceptual constituent that belongs to one of the major ontological categories If a major phrasal constituent is used *referentially*, it corresponds to a *projectable* instance of a major ontological category In other words, all major phrasal categories play the role assigned to NPs alone in first-order logic

THING and STATE in 3 are two of the ontological categories that Jackendoff proposes Others are PLACE, DIRECTION, ACTION, EVENT, MANNER, AMOUNT, PROPERTY (Jackendoff 1983 68) This in not intended as an exhaustive list of ontological categories He conjectures, however, that "the total set of such categories must be universal it constitutes one basic dimension along which humans can organize their experience, and hence it cannot be learned .." (Jackendoff 1983 56)

The TYPE or TOKEN label that Jackendoff attaches to the ontological categories in 3 is supposed to reflect the projectability of the expression to which it corresponds, hence its referentiality. For the phrases in the sentence in 1 (a), 'Felicia', the name of the thing being categorized, corresponds to the TOKEN concept, while the category expressed by 'tiger' corresponds to a TYPE concept. Finally the state of affairs expressed by the whole sentence corresponds to a TOKEN concept The only formal distinction between the type and token concepts is the label. Their internal structure is apparently identical, since the function BE, the conceptual well-formedness rules and the rules of inference apply to either or both (Jackendoff 1983 82-83) Token concepts correspond to referring expressions,

while type concepts correspond to non-referring expressions (Jackendoff 1983 91-92) The phenomenological distinction between token and type conceptual structures is that tokens correspond to experience, while types do not Types contain "rules," but Jackendoff does not reveal their nature or the kinds of principles or conditions they contain that are necessary for making the "creativity of categorization" possible (Jackendoff 1983 83) He claims that "one can experience types only through the character of the projected instance " (Jackendoff 1983 93) The token can be projected into awareness and form part of the projected world, which is characterized by Jackendoff as the world of reference or "the world of experience " Entities in the projected world are mental constructs that are isomorphic to a subset of the total conceptual structures

Jackendoff contrasts his proposal to other semantic theories which "regard categorization as grasping something in the real world " For Jackendoff, "a categorization judgment is the outcome of the juxtaposition of two conceptual structures " (1983 78) To provide a uniform treatment of reference, Jackendoff suggests replacing the real world extension by a projected world extension (This proposal was discussed in 1 2 2)

Jackendoff considers other sentences of the form [NP be NP] Below are some sentences containing expressions that correspond to type and/or token concepts Sentences 4 (a)-(c) are Jackendoff's examples (1983: 88-89) The rest illustrate his observation that "one can create new [TYPE] concepts at will " (1983 82) In sentences 4 (d)-(e), 'no Superman' and 'a Superman' express the type Superman that is presumably similar to the token Superman

4 (a) Clark Kent is a reporter
Token Type

(b) Clark Kent is Superman
Token Token

(c) Clark Kent is the man drinking a martini
Token Token or Type

(d) Clev Klutz is no Superman
Token Type

(e) A Superman is a hero
Type Type

For these sentence types, Jackendoff proposes three different conceptual representations for the verb 'be'

5 (a) IS AN INSTANCE OF (TOKEN, TYPE)

(b) IS TOKEN-IDENTICAL TO (TOKEN, TOKEN)

(c) (either (a) or (b))

(d) IS INCLUDED IN (TYPE, TYPE)

(In these representations I omit the ontological category of the function All of the functions map into a conceptual constituent belonging to the major ontological category [STATE TOKEN]) In the notation of set theory, Jackendoff's paraphrases of 'be' would be represented by the symbols 'ϵ', '=', and '$\subseteq$', respectively (Jackendoff 1983: 89, 96)

6 (a) TOKEN ϵ TYPE

(b) TOKEN = TOKEN

(c) TOKEN = TOKEN or TOKEN ϵ TYPE

(d) TYPE $\subseteq$ TYPE

Having provided paraphrase analyses for the verb 'be' co-occurring with three different types of NP pairs, Jackendoff then proceeds to argue for the conceptual unity of the INSTANCE, TOKEN-IDENTITY, AND INCLUSION readings of 'be' (1983: 96) He claims that 'be' surrounded by two arguments expresses the same function, which is insensitive to the TYPE-TOKEN feature of conceptual expressions He considers all three readings to be special cases of a general function, which he represents as "BE (x, y)." (Jackendoff 1983 90) The function BE must do "similar work" in all the sentence types in 4, since the internal structures of the concepts that the function BE must examine are organized by the same principles, whether they are TYPES or TOKENS. Furthermore, Jackendoff argues, the same verb 'be' appears in all of these sentence types. This analysis thus accounts for all the linguistic facts, according to Jackendoff (1983: 96-97).

To account for the creativity of the process of categorization, Jackendoff postulates some operators or rules that make the internal structures of the type and token concepts accessible to each

other The outputs of the operators are related by an inference rule to the conceptual representation of any categorization judgments These operators and the inference rule are illustrated next

7 Operators and inference rules

(a) INSTANCE OF

[THING TOKEN
INSTANCE OF ([THING TYPE
DOG])]

(b) EXEMPLIFIED BY

[THING TYPE
DOG
EXEMPLIFIED BY ([THING TOKEN
MAX])]

7 (c) INFERENCE RULES

[STATE
BE ([X] i, [TYPE]j)] $\Longleftrightarrow$ [[X
INSTANCE OF ([TYPE]j)]$_i$ [TYPE
EXEMPLIFIED BY ([X]i)]$_j$]

The operators in 7 (a) and (b) permit the transfer of information between type and token conceptual structures. The "INSTANCE-OF" operator (a) maps a type constituent into a feature of a token constituent; the "EXEMPLIFIED-BY" operator (b) maps a token into a feature of a type. According to the inference rule stated in (c), one may infer either "instance-of" information or "exemplified-by" information from a categorization judgment, or vice versa. That is, on the basis of the knowledge that X is an instance of type Y or that type Y is exemplified by token X, one may infer a certain state of affairs that is described by the corresponding categorical sentence.

This ends my summary of Jackendoff's analysis of sentences of the form [NP be NP] and the devices that he proposes to account for categorization judgments Now I will point out some problems that I find with this analysis. These are problems that my analysis of elementary sentences containing 'be' will seek to avoid or to solve

Discussion. My comments here will be directed toward Jackendoff's proposal as an account of the semantics of elementary sentences containing 'be' and the constructs that he considers essential I shall not comment further on his observations concerning the psychological nature of categorization Rather, my attention in the remainder of this work will be limited to his linguistic semantic analysis, i e , the specification of the conceptual information associated with the lexical items and phrases contained in categorical sentences

I agree with Jackendoff's conceptual analysis of 'be' as far as it goes, but as I shall explain, it is incomplete Jackendoff's representation of the conceptual analysis of 'be' as BE (x,y) simply does not go far enough. This conceptual analysis of 'be' is not very informative. The only information that this formalization gives is that 'be' is analyzed as a "two-place function comparing two relata" The relata are the conceptual constituents that correspond to the syntactic categories that are strictly subcategorized by the verb, e g., the NPs in the sentences of the surface form [NP be NP] Presumably we may think of a function as an operation that effects "an association between objects," strictly speaking, "a correspondence that assigns to a given object one and only one other object " (Goldblatt 1984 17) Although Jackendoff (1983 96) proposes, in all, three different conceptual analyses of 'be', IS AN INSTANCE OF (x,y), IS TOKEN-IDENTICAL TO (x, y), and IS INCLUDED IN (x,y), he collapses these into "a single reading" which he formalizes as "BE (x,y) " The main problem is that this analysis does not indicate what the function BE is supposed to do. How are the relata to be associated with each other? The function that is designated by the verb 'be' must do more than merely compare the two conceptual constituents that it relates. Thus the conceptual structure [A BE C] is not an adequate analysis of the linguistic expression 'A is C'. How can we judge whether [A BE C] provides a necessary condition for saying that 'A is C'? Is it possible to find counterexamples? Yet BE (x,y) is

supposed to encompass three specific analyses of 'be', instantiation, token-identity, and inclusion The conceptual constituent [BE] is said to comprehend all of the operations designated by the set-theoretic symbols: 'ϵ' '=', '$\subseteq$'. These are all informative Because Jackendoff does not explicitly ascribe any content to [BE] in "BE(x,y)," it is impossible to judge whether or not he is justified in collapsing these three readings as he does As a consequence, the conceptual representation [BE] is hardly more informative than the linguistic expression 'be'

Formally, Jackendoff's function "BE (x,y)" looks like a standard representation of a two-place relational predicate in MPL notation Compare the following open sentences

10 (a) HIT (x,y)

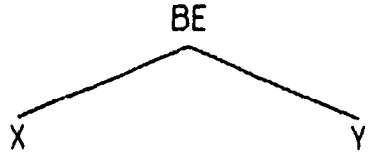
(b) BE (x,y)

Certainly Jackendoff does not mean to suggest that a sentence containing 'be' expresses a dyadic proposition in the same way that a sentence containing 'hit' does In view of this, and given that he argues so convincingly against the use of first-order logical notation to represent the conceptual structure of sentences, it is surprising that he would choose this format to represent the analysis of 'be' This formalization is also questionable with respect to his own "grammatical constraint," which would lead one to prefer a one to one mapping between syntax and conceptual structure. The surface order of the phrases in English sentences containing 'be' is [NP be NP].

11 [$_{NP}$Superman] [$_{VP}$is [$_{NP}$a manic depressive]]

The representation "BE (x,y)" might fit onto a structure in which the conceptual constituents would be organized hierarchically as follows.

12

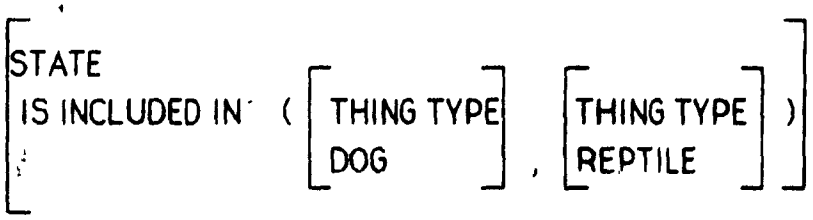


Jackendoff does not attempt to justify his formalization, although it may be justifiable. For instance, he could analyze the verb as the "head" of a sentence from both the syntactic and semantic standpoints. Certainly it is the verb that determines the ontological category of the sentence as a STATE or EVENT. This sounds like a reasonable argument. If it is valid, the surface phrase order of English declarative sentences still needs to be explained. Also the correspondence rules relating the syntactic structures with conceptual structures still need to be formulated.

Jackendoff's representation of the conceptual structure of sentences of the form [NP be NP] is open to further criticism. With respect to the guiding principle of compositionality (Jackendoff adopts a rather strong version of this), the representation does not provide an analysis of the internal structure of the NP. It does not indicate which conceptual constituents are contributed by expressions of which syntactic category, whether nouns or determiners. For the sentence in 13, Jackendoff (1983: 95-96) presents the following representation.

13 A dog is a reptile.

13



The representation includes bare nouns, but ignores the determiner 'a' of both NPs

Type-token distinction. Next, I shall examine Jackendoff's distinction between type and token conceptual constituents. What I find to be questionable is the claim that tokens are "projectable" and hence correspond to "referring expressions," while types are not "projectable," and correspond to "non-referring" expressions. (I have already examined Jackendoff's idea of the 'projected world' as the domain of *reference* in 1.2.2.) Here I shall argue that only type concepts are required for a linguistic semantic analysis. I will claim that concepts represent information concerning "types," basically as described by Jackendoff.

Let us begin by examining Jackendoff's characterization of type and token concepts. According to Jackendoff, the token corresponds "to the constant of a first-order atomic sentence." It is "a mental construct of potentially elaborate internal structure, which can be projected into awareness as a unified #entity#." On the other hand a "[TYPE] concept is the information that the organism creates and stores when it learns a category." (Jackendoff 1983: 78). Although the type-token distinction is perhaps parallel to the MPL distinction between predicates and constants and the set-theoretic distinction between sets or classes and elements, Jackendoff claims that tokens and types are "less differentiated: they are both variable-free conceptual constituents, marked in similar fashion for major ontological category." (Jackendoff 1983: 81).

In his formal representations of categorical sentences, a type or token feature is attached to the major ontological category For the sentence,

14 (a) Clark Kent is a reporter.

Jackendoff provides the following conceptual representation.

14 (b)

$$\left[\begin{array}{l}\text{STATE TOKEN} \\ \text{IS AN INSTANCE OF } \left(\left[\begin{array}{l}\text{THING TOKEN} \\ \text{CLARK KENT}\end{array}\right], \left[\begin{array}{l}\text{THING TYPE} \\ \text{REPORTER}\end{array}\right]\right)\end{array}\right]$$

By hypothesis, "every major phrasal constituent in a sentence corresponds to a conceptual constituent in the semantic structure of a sentence." (Jackendoff 1983: 76). For categorical sentences, some of the conceptual constituents are major ontological categories. Since these correspond to phrases, it is not clear exactly how or which linguistic expression(s) are associated with the conceptual structure that is a type or a token. Are we to understand that the information that an entity is a type or a token is stored only with the concepts for the major ontological categories: THING, STATE, EVENT, PLACE, AMOUNT, PROPERTY, etc.? Or are the concepts corresponding to individual lexical items such as 'Clark Kent' and 'reporter themselves stored twice, once as tokens and again as types? If so, then clearly, this would be an uneconomical utilization of conceptual structures. By way of hypothesis,

the internal structure of type and token concepts is identical, only the label differs according to the TYPE-TOKEN feature Given the constraint of our finite mental storage space (Jackendoff 1983 7), it seems that a more economical theory would associate only one conceptual analysis with a single lexical item, e g , 'dog' in the following sentence types

15 (a) This is a dog

(b) A dog is here.

Also given the similarity of their internal structures, it seems questionable that one kind of concept should be projectable into awareness [TOKENS], while the other [TYPES] would not enter into the speakers' world of experience. According to Jackendoff (1983 92), type concepts do not correspond directly to experience " They can be experienced "only through the character of . projected instances " But what is the nature of the experience that is elicited by the token concept that corresponds to the expressions 'Clark Kent' which fails to be elicited by type concepts that correspond to expressions such as 'reporter' as in 14 (a) It is unclear why 'a dog' should be projectable in 15 (b) but not in 15 (a). If types are not projectable into awareness, how can one explain the possibility of learning facts that are expressible in generic categorical sentences? How would a speaker grasp the following statements and the corresponding states of affairs?

16 (a) A tiger (Type) is a cat. (Type)

(b) A triangle (Type) is a three-sided figure (Type)

Cohsider the sentences in 17 which contain types (c) and (d) supposedly generated from tokens (a) and (b)

17 (a) Clark Kent is Superman. (Token)

(b) Clay Klutz is not Superman. (Token)

(c) Clay Klutz is no Superman. (Type)

(d) A Superman is a hero.
Type Type

This is a peculiar result of the analysis. Although the concepts corresponding to 'Superman' in all of the sentences in 17 are said to have the same internal structure, the ones in sentences (a) and (b) are said to be "projectable into awareness" as tokens, while as types in (c) and (d), they are not projectable. This is so, even though they are generated from a structure like [TOKEN THING/SUPERMAN] as in (a) and (b), where the *Superman* concept is projectable. Let me restate the question in more general terms. Why should a type concept (that is created from a projectable token concept) not be projectable itself?

18 PROJECTABLE NOT PROJECTABLE

[THING TOKEN SUPERMAN] → [THING TYPE SUPERMAN]

Let me try another tack. Appealing to the fundamental distinction between categoremata and syncategoremata, the characterization of an expression such as 'a Superman' as a non-referential strikes me as anomalous. If it were, would its property of non-referentiality be similar to that of the lexical items 'is', 'not', 'no', 'a' in the sentences in 17 above? If not, how does it differ? The NPs 'Superman' in 20 (a) and (b) map into the major ontological category THING and the NPs 'no Superman' and 'a Superman' in (c) and (d) map into major ontological category THING. The only distinction between the two conceptual structures is that THING in (a) and (b) is labelled "TOKEN" while THING in (c) and (d) is labelled "TYPE." Thus the difference must be attributable to the presence of a determiner 'no' or 'a', though this contribution is not explicitly indicated in Jackendoff's representation. What seems inconsistent to me is Jackendoff's claim that an expression that is said to be "non-referring" can map into a major ontological category such as THING in the first place. More generally, how does it happen that a conceptual constituent that belongs to the major ontological category THING is not experienceable or graspable? Clearly Jackendoff's use of the terms 'referring',

and 'non-referring' must be understood in the context of the "projected world" as the domain of reference

It seems that Jackendoff would substitute projectability for truth He claims that if a particular conceptual representation is said to be "projectable" in his hypothesis, this metalinguistic statement would be the counterpart of the expression "'Da' is true" in the metalanguage of logic." (Jackendoff 1983 80). Suppose that the referent of the subject 'Max' in 19 (b) were in fact a dog.

19 (a) A dog is a reptile.

(b) Max is a reptile

Are we to understand then that this sentence would be "true," since the representation is "projectable" by hypothesis?

19 (a)
$$\begin{bmatrix} \text{STATE} \\ \text{IS INCLUDED IN} \left(\begin{bmatrix} \text{THING TYPE} \\ \text{DOG} \end{bmatrix}, \begin{bmatrix} \text{THING TYPE} \\ \text{REPTILE} \end{bmatrix} \right) \end{bmatrix}$$

(b)
$$\begin{bmatrix} \text{STATE TOKEN} \\ \text{IS AN INSTANCE OF} \left(\begin{bmatrix} \text{THING TOKEN} \\ \text{MAX} \end{bmatrix}, \begin{bmatrix} \text{THING TYPE} \\ \text{REPTILE} \end{bmatrix} \right) \end{bmatrix}$$

It should also be true just in case 19 (a) is true. The representation in 19 (a) (Jackendoff 1983 96) is unspecified for Token or Type, although in a footnote (1983 253, n 1), Jackendoff says that he leans toward TYPE for the STATE or SITUATION expressed by generic sentences of this type. But regardless of which is chosen for 19 (a), both representations would still express falsehoods It is entirely unclear to me in what sense projectability is supposed to be equivalent to truth Furthermore, since Jackendoff rejects a metatheoretical notion of *truth*, it is unclear how he would prevent the generation of inferences that likewise express utter falsehoods, whether they are based

on projectable or non-projectable representations. (In 1 2.3, I will consider some general problems in connection with the rejection of the notion of *truth* for the semantic analysis of language.)

Since the type-token distinction between concepts is questionable, it is also questionable that both kinds are necessary for the conceptual analysis of linguistic expressions. Since I reject the type-token distinction between concepts, I would deny that token information is necessary for the conceptual analysis of linguistic expressions. There is thus no need for redundancy rules to transfer information between these token and type conceptual constituents

There is, however, a type of information that Jackendoff would represent for each and every sentence expressing categorization judgments which I think should be represented by redundancy rules. Here I am referring to the assignment of major ontological categories (e.g., his [THING], [STATE]) to phrases and clauses. It seems to me that this is the kind of information that redundancy rules or meaning postulates are designed to handle. Relations that hold systematically between expressions and concepts need not be repeated each time the expressions occur. For example, if 'be' always maps into a function BE (x,y), which in turn maps into a STATE concept, then "BE (x,y) → STATE" need be represented only once in conceptual structures. When the information concerning STATE is explicitly required, it will always be accessible through the verb 'be' (The major ontological categories are rarely discussed explicitly by ordinary speakers anyway) For these reasons, the representation of the ontological categories by meaning postulates would seem to be appropriate (See Carnap 1956; Fodor 1977; Fodor and Fodor 1980; Jackendoff 1975 for discussions of meaning postulates or redundancy rules.) Or if, as Jackendoff claims, the major ontological categories are innate,[1] perhaps they need not be represented at all in connection with linguistic expressions.

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[1]Moravcsik (1975: 82-84) brings up several questions that are relevant to the innateness issue, illustrating its enormity. In this work, I do not assume that any substantive information or concepts are innately given, but only certain basic cognitive abilities. These include the formation of concepts, both simple and complex, the applicability of concepts to entities of all types, the differentiation among concepts, the recognition of sameness and difference between entities of all types, relations among concepts and other entities, etc.

Finally, I wish to argue that if some NPs are "referring expressions" in Jackendoff's sense, then the predicate complements of 'be' are also referential. Generally, I will argue that the notion of *referentiality* cannot be used in the hypothetical distinction between expressions that correspond to type and token concepts. In his argumentation to show that major phrasal categories other than NPs can be used referentially, Jackendoff proposes various tests for the referentiality of expressions. He claims, like Aristotle (*Categories* I: 5), that "each of the ontological categories ... permits the formation of a 'wh'-question. In the case of [THING], [PLACE] ... [AMOUNT], the 'wh'-word is of the same syntactic category as the corresponding pragmatic anaphor." (Jackendoff 1983: 53)

20 (a) What did you buy? [THING]

(b) Where is my coat? [PLACE]

(c) How long was the fish? [AMOUNT]

Jackendoff (1983: 53) further claims that

> according to our theory of consciousness, one can formulate a *wh*-question only if the gap in one's knowledge is a *projectable* gap. In other words, the answer to a *wh*-question must be a phrase denoting a projectable #entity#.

In view of this claim, consider the following questions.

21 (a) What is this/that?

(b) What is a triangle?

(c) Who is that man?

(d) What is Bill? (What does Bill do?)

The answers to these questions are expressible in the phrases that function as predicate complements of categorical sentences, as underlined below.

22 (a) That is a strawberry/ my fiddle/ a tennis racket.

(b) A triangle is a three-sided figure.

(c) That man is a thief/Ted/the piano tuner you telephoned.

(d) Bill is a dentist.

Thus, according to Jackendoff's test for referentiality, phrases that function as the predicate complements of 'be' are referring expressions after all Predicate complements also correspond to a "projectable gap." But one might object, questioning the validity of Jackendoff's test for the referentiality of phrases For if it were a good test, then the expressions that function as the predicate complements of 'be' would also pass as "referring" expressions

I do agree with Jackendoff's (and Aristotle's) test (See 1 2.2 (ii) and 5 2 2) In any case, the results of the test are consistent with certain other aspects of Jackendoff's analysis For instance, the predicate complement phrase also maps into a conceptual constituent belonging to a major ontological category Also Jackendoff stresses the similarity of the internal structures of the type and token conceptual constituents that correspond to the same expressions in either the subject or predicate complement position The next logical move would be to give up the distinction between type and token conceptual constituents, which is problematical in any case This would eliminate what I consider to be a reduplication of concepts in the mind

If the "projectability" of expressions is to play a crucial role in the conceptual analysis of elementary sentences containing 'be', then it must be understood as the directability of type concepts toward entities in a world of discourse These sentence types are composed of two obligatory phrases, each containing a categorematic expression Each categorematic expression belongs to a major ontological category A defining property of referentiality for an expression might be its capacity to map into an ontological category independently That is, an expression is virtually referential (or denotative) if and only if it (signifies a concept and denotes an entity or type that) belongs to a major ontological category All in all, this conforms with the classical and traditional notion of *referentiality* as it is used in philosophical semantics I will argue that the operative distinction then is between categorematic and syncategorematic expressions. Thus the projectable-non-projectable distinction seems irrelevant for the analysis of expressions that belong to the major ontological categories

It is important to notice that I do not claim that speakers cannot distinguish between types and tokens. Although I agree basically with Jackendoff's characterization of type concepts, I do not agree that individuation depends on token conceptual constituents, (i.e., distinct from types having the same

content) For the sake of argument, let us suppose that speakers have two sets of conceptual constituents for the major ontological categories Since individuation is a process of distinguishing entities of a certain type, it would be impossible to recognize an entity as a token of something (a type) if one did not first recognize it as belonging to a type Thus a type concept is prior to the corresponding token concept Therefore, if one has a type concept, then there is no need for the corresponding token concept, since, as Jackendoff himself claims, the type contains all the criterial information required to determine its extension in the first place As I see it, for things that are countable, the problem of apprehending or recognizing a group of things as something or other is the same whether the group consists of one token or an infinity The notion of *token* is rightly complex It consists of a type concept plus the numerical concept of *one*, which is another type concept Apprehending something as a token of a thing means grasping those properties of thinghood that are encoded in the concept *thing* as type information and the notion of *oneness* or *singleness* Thus, I would argue that the basic processes of categorization and individuation depend on the capacity to recognize that properties are of the same type (or different) and the capacity to quantify

Jackendoff (1983 92) argues that one can experience a "[TYPE] only through the character of its projected #instance#" Part of this claim seems quite correct But what does it mean to experience or grasp the "character" of an entity? It is necessary to process "type" information in order to determine the character of a thing Aristotle seems to have held this view He claims that although it is indeed only individual entities that one encounters in the world, what is "knowable" about these entities is in fact "universal" I suppose then, following Aristotle, that what is conceivable about an entity that we apprehend is general, universal or "type" information A thing is what it is because of its structure and properties And we recognize a thing for what it is by its properties, not just as a token or as a projected entity *tout court* In contradistinction to Plato, Aristotle claims that properties do not exist apart from the individuals that instantiate these properties Whatever is said about an individual is said to be either of (accidental predication) or in the thing (essential predication) But by the same token, no individual thing

"(prâgma) exists separated from the qualities that are perceived by the senses. The intelligible forms are contained in the perceptible forms" (Arens 1984 82, the emphasis is mine)[2]

Conclusions. The analysis that I will propose and support in this work does not depend on or recognize the type-token distinction between concepts I shall, in fact, assume that all concepts are like Jackendoff's types. For my purposes in this work, I assume that only type concepts are relevant for linguistic semantic analysis All terms (categorematic expressions of natural language) correspond to type concepts. Moreover, I take it that a proper name expresses a type concept just as much as a general term does. Every time a name is used one must apply certain general criteria to determine the referent, even though it is always the same individual As Haiman (1984 93) observes, "calling the same individual by the same name does unquestionably involve an act of generalization, the willingness to overlook different sense impressions in order to gain a coherent picture of our world." Forming or applying a concept is thus an exercise in abstraction, which seems to be yet another prerequisite for the successful use of natural language

1.3.2 Semantic roles (thematic relations)

In the analysis of natural language sentences, linguists who work in many different theoretical frameworks use constructs called "semantic roles" Semantic roles are designated by terms such as 'actor' or 'agent', 'theme', 'source', 'goal', 'location', etc. These terms have been used by different linguists to refer to entities and relations of various kinds, both linguistic and extralinguistic. In particular, the same terms are used for both syntactic and semantic analysis The following description is extracted from a dictionary article entitled "Actor-action-goal." (Crystal 1980: 12-13): "... In the sentence *John saw a duck*, for example, *John* is the actor, *saw* the action, and *a duck* the goal." From this description, one might infer on the basis of the typography that an

[2]See Tondl (1981· ch 8) for a discussion of the controversy between nominalists and phenomenalists over the priority of property versus individual

actor is an NP that functions as the subject and a goal is an NP that functions as the object in an active sentence. But, as Crystal indicates, the same terms are used for both grammatical and semantic analysis. In linguistic literature, it is not unusual to find descriptions in which syntactic and semantic notions are conflated in this way. In a semantic description, the linguist would use the term 'actor', 'goal', etc., to refer to the role played by the referent of a NP. In the case of John's seeing the duck, the terms 'actor' and 'goal' would be used to refer to the roles played by the referents of the name 'John' and the NP 'the duck', respectively.

Some linguists approach the analysis of the information content of sentences by analogy to a dramatic scene. For example, Langendoen (1970: 62) writes

> Semantic relationships are most easily and directly described in terms of *roles*-as if each sentence were a miniature drama, whose plot is given by the main predicate and whose actors (in their various roles) are the nominal expressions that occur with them .. The individual ... responsible for carrying out the plot is called the agent, the person or thing affected, the patient, the thing (tool, device) used by the agent, the instrument. We also have such roles as goal, source or origin, location, direction and result. Roles can be thought of as labels for the variables that stand in relation to predicates.

Here the actors are said to be "the nominal expressions" and roles are "labels for the variables". Langendoen does not elaborate on the kind of relation that holds between the "variables" and "predicates" that he mentions.

Within generative grammar, this approach is represented by several different hypotheses, in which the constructs of semantic roles are postulated as primitive and are sometimes even claimed to be "innate" semantic concepts. These hypotheses include the "case grammar" of Fillmore (1968, 1971), the "semantic roles" of Katz (1972, 1977), and "thematic relations" proposed by Gruber (1976) and Jackendoff (1972, 1976, 1978, 1983). Such semantic constructs are accepted without argument by many other linguists working in generative grammar: S. Anderson (1977), Bresnan (1978, 1981, 1982), Chomsky (1981, 1981a), Culicover and Wilkins (1984). Note that, except for Fillmore, Gruber and Jackendoff, these authors mostly assume that there is a valid semantic theory of thematic relations; they do not argue for one or attempt to justify it semantically themselves.

In the framework of generative grammar, descriptions in which the linguist uses terms such as 'Agent' and 'Theme' to refer explicitly to linguistic entities are becoming more common. For example, Williams (1981: 87) writes: "The Theme of *hit* is the NP that is immediately dominated by the VP of which *hit* is the head." This is another way to say that the Theme of 'hit' is the NP that functions as its direct object. Williams wishes to avoid such traditional terms of grammatical analysis since they have become "ambiguous." But as illustrated here, the terms 'Agent' and 'Theme' are hardly less ambiguous than 'subject' and 'object'. Since Williams treats Theme and Agent as either "internal" or "external" arguments (that is with respect to the VP, a linguistic entity), he must consider them to be not only linguistic entities, but more specifically syntactic entities. An Agent or Theme as a person or thing participating in extralinguistic situations would always be "external" to the VP. Accordingly, Williams (1981) does not ascribe any semantic content to the thematic roles he describes; he even mentions that the labels are unimportant. Williams merely uses the labels to distinguish syntactic arguments from each other.

Williams' use of thematic roles such as Agent and Theme seems to follow the spirit of Chomsky's θ-theory. In introducing the notion of the abstract "*θ-role*," Chomsky (1981: 35) remarks that it is related to the notions of Fillmore, Gruber, Jackendoff, Katz, etc. Like most of the linguists whose works are cited above, Chomsky seems to assume that sentences must be interpreted "thematically" and that the assignment of a set of θ-roles or thematic relations to the syntactic arguments of the sentence takes place within "sentence grammar" (e.g., Chomsky 1975: 105; 1977: 58; 1981a: 12). Chomsky seems, however, to concentrate more on the use of θ-roles in syntactic well-formedness conditions rather than on the semantic differentiation between the roles actually assigned to the arguments. For instance, θ-roles are used in the statement of the θ-Criterion, which is a well-formedness condition on the LF (logical form) level of representation. The θ-Criterion limits each argument to one and only one θ-role at LF.[22] It could be used to rule out an ungrammatical sequence such as the following.

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[22]Chomsky (1982) traces the conditions subsumed in the θ-Criterion to Freidin (1978: 537).

1 (a) it seems to each other that they are happy (*)

and to account for the argument structure of sentences containing "function chains." These consist of a moved argument constituent and its trace (t), which together "have no more than one θ-position." The NP subject is said to result from movement in the sentence in 1 (b).

1 (b) they seem to each other t to be happy.

Chomsky posits the following deep structure representation for both 1 (a) and (b).

1 (c) $[_{S_1}$ NP INFL $[_{VP}[_V$ seem$]$ $[_{PP}$to each other$][_{S_2}$ they INFL be happy$]]]$

In both sentences, Chomsky (1981. 43-44) says that the "θ-role of *they*" is the θ-role of "the subject of the predicate *be-happy*, as determined by the GF (grammatical function) of *they* as $[NP, S_2]$." This is shown by the labelled bracketing in 1 (c).

Although some linguists, e.g., Culicover and Wilkins (1984: 13), still maintain that "the grammar must represent differences in thematic roles assigned to NPs in a sentence ... " not everyone agrees that it is necessary to specify which thematic role or θ-role is assigned to a particular argument. Indeed Hornstein (1984: 114-115) argues that grammatical constraints such as the θ-Criterion, which are assumed to be significant for interpretation, involve basically syntactic notions.

> It is interesting from our perspective to observe that the θ-Criterion is a condition stated on NPs, which are syntactic objects. In fact, not only is it stated on syntactic objects--it cannot be stated on the *semantic values* of these syntactic objects rather than on the syntactic objects themselves. Why not? Consider ... a sentence like (14):
>
> 14 John$_i$ hit himself$_i$
>
> In (14) 'John' and 'himself' are coreferential; they both refer to the same individual John. Thus, John himself has two θ-roles. However, since the NPs 'John' and 'himself' each have one and only one θ-role, the θ-Criterion judges the sentence fully acceptable. If the θ-Criterion were stated on semantic values of NPs rather than on the syntactic object itself, (14) would presumably be unacceptable ... In short, it is precisely a syntactic reading of the θ-Criterion that yields the correct empirical results.

Hornstein demonstrates here that the domain of the θ-Criterion is syntactic and suggests that the θ-role should be used only as a construct in syntactic well-formedness conditions But even so, it seems that semantic theory and syntactic theory should agree as to which constituents would count as arguments

Thematic roles applied to elementary sentences containing 'be'. Now I will turn to the question of the function of thematic relations as semantic constructs in a mentalist theory of language I will discuss the application of these constructs to elementary sentences containing the verb 'be

First let us notice that not all linguists who adopt a semantic role approach would analyze these sentences in the same way, in terms of thematic relations taken as semantic constructs That is, for sentences of the form [NP be XP], not all linguists (whose works are reviewed here) would assign thematic relations (semantic roles, cases, or θ-roles as the case may be) to both the NP and the XP For example, Culicover and Wilkins (1984 24) claim that the predicate XP bears no thematic role Thus, the XPs that function as the complements of 'be' would not be analyzed by Culicover and Wilkins as terms or arguments, as they are in Chomsky (1982). In the following examples, each bracketed position is a so-called "θ-position" or an "argument position " (Chomsky 1982 36)

2 [these truths] are [self-evident]

3 [we] put [the books] [on [the table]]

By analogy with the analysis in 3, 'on the table' would presumably be analyzed as an argument in the following sentence.

4 [the books] are [on [the table]]

Clearly, if either the theory of thematic relations or θ-theory is to be valid as a basis for semantic analysis, then it must provide guidelines for determining which syntactic categories and positions should be assigned thematic relations. For elementary sentence containing 'be', the controversial question is whether thematic relations should be assigned to the expressions that

function as the predicate complement of 'be' Or in other words, for a sentence of the form 'NP be XP' would the XP be considered as an "argument" or not? Now Chomsky (1981 35) describes "NP arguments" as "NPs with some sort of 'referential function', including names, variables, anaphors, pronouns, but not idiom chunks or elements inserted to occupy an obligatory position in syntactic structure " Also for Culicover and Wilkins (1984 15), "the crucial property of any NP with respect to the assignment of thematic roles is that it have a referent " So the controversial point basically concerns the referentiality of XP But apparently there is no consensus about the referentiality of expressions such as 'happy' as in 1, 'self-evident' as in 2, and 'on the table' as in 4.[23]

Now perhaps it is for syntactic reasons that Culicover and Wilkins would not assign a thematic role to the expression that functions as the predicate complement of 'be' They adopt Anderson's theme rule (Anderson 1977), which says, "Assign theme to the object if there is one, otherwise, assign theme to the subject " (Culicover and Wilkins 1984 13)) If the term 'object' were defined configurationally as [NP,VP] or strictly as a syntactic relation, then Theme would be assigned to the predicate complement position according to Anderson's Theme rule But, for Culicover and Wilkins, the assignment of a grammatical function is lexical, not strictly syntactic Therefore, Theme would probably be assigned by the "otherwise" clause to the NP that functions as the subject of sentences such as

5 The meat is raw
  Theme

and the so-called "predicate" is assigned no thematic relation

For sentences containing 'be', Chomsky's analysis of "argument" or "θ-positions" seems to be closer to the analysis proposed by Gruber (1976) and Jackendoff (1972, 1976, 1983). According to their hypothesis of thematic relations, the verb 'be' invariably takes two arguments which are assigned the thematic relations Theme (T) and location (L) Thus all sentences containing the same

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[23]The notion of *reference* is characterized by Chomsky (1981. 324) as follows. The "denotata" of expressions or "values of variables" are "entities of mental representation" in the domain D Reference, in this sense, is an intramental relation, as for Jackendoff (1983) (See 1 2 2 (iii) for a discussion of this phenomenon.)

morphological verb 'be' would receive the same assignment of thematic relations, as illustrated for the following sentences

6 (a) Pat is a bachelor
T L

(b) These truths are self-evident
T L

(c) The cards are on the table
T L

(d) The tiger is sleeping
L

Gruber and Jackendoff would view the assignment of the thematic relations Theme and Location to NP subjects and XP complements of 'be', respectively, as part of the conceptual analysis of these sentence types Furthermore, it is not clear how a purely syntactic component of sentence grammar could determine which sentence positions are argument-positions or non-argument positions, without some prior information concerning the semantics of verbs This information is assumed to be a part of the lexical entry of the verb

In general, semantic roles and similar constructs are characterized in the literature much as Fillmore (1968. 24) describes cases.

> . The case notions comprise a set of universal, presumably innate, concepts which identify certain types of judgments human beings are capable of making about events who did it, who it happened to, and what got changed.

Jackendoff (1978 228) makes similar claims about thematic relations Theme, Location, etc., are taken as elementary "conceptual structures" having no "direct correspondence with the physical world" but resulting from "the way the mind structures its perception of the world." Jackendoff (1983: 209-210) views "thematic structure as an innate organization with which the organism structures its experience." Thematic relations are seen to generalize over conceptual structures that belong to more basic ontological categories that recur in various fields of discourse.

While Jackendoff claims that the concepts underlying the thematic relations provide a framework by which we structure our experience, there is another hypothesis which says that

semantic roles also provide a structural framework for language In Marantz (1981), the author argues that the source of grammatical relations is their underlying semantic relations. He describes semantic roles as "logico-semantic relations" holding between any predicate and its subject That is, they are said to be "relations among sentential constituents" (Marantz 1981 2)

The only other generative linguist, to my knowledge, who has analyzed semantic roles as relational concepts is Katz (1972, 1977) Katz draws a comparison between sets of semantic roles and sets of grammatical relations The sets differ in that "grammatical relations are defined over phrase markers," while semantic roles, determined crucially by features of lexical verbs and underlying (deep structure) grammatical relations, "are defined over semantic representations" (Katz 1972 113)

One sometimes gets the impression that linguists believe that the assignment of semantic roles (thematic relations) to arguments is the only syntactic (or semantic) operation that is essential for the analysis of the propositional content of a sentence. But even Jackendoff is critical of such a simplification He claims (1983. 209) that "the theory of thematic relations depends crucially on an enriched ontology" and other conceptual notions. Recently a great deal of linguistic research on semantic roles has nevertheless been devoted to the discovery of the precise (correct and complete) list of semantic roles that can be expressed in sentences of natural language Many a linguist working in the field has created a particular list of hypothetical semantic roles (See, e.g., *Valence, semantic case and grammatical relations*. 1978.) Although the analysis of certain semantic roles according to different linguists often reflect the same basic intuitions, different hypotheses in fact often lead to different claims about semantic relations that are expressible in natural language or across languages.[24] Under these circumstances, the questions of the universality and innateness of semantic roles are contingent The fact that such concepts are limited to only five or six is questionable in view

[24]How is this possible if semantic roles represent conceptual structures that are truly innate? In my research project on the criteria for semantic roles (Styan 1983), I found no uniformity in the criteria that various linguists use to identify semantic roles. The criteria vary from the wholly semantic (e.g., Nilsen and Nilsen 1975) to the wholly syntactic (e.g., Starosta 1978: 508). Thus, given the considerable number of different hypotheses, it is not really clear what it is that is supposed to be innate.

of the lexicological work of Mel'čuk (see, e.g., Mel'čuk, Iordanskaja, Arbatchewsky-Jumarie 1981), who identifies some fifty so-called "lexical functions." In fact, not all linguists agree that general semantic roles such as Agent, Theme, Location, are very useful for formal grammatical analysis (e.g., Wehlin 1975); other linguists have expressed skepticism (e.g., Freidin 1975; Serbat 1981). Some psycholinguists explicitly deny the necessity to postulate formal semantic roles (e.g., Miller and Johnson-Laird 1976: 482, 686; Moulton and Robinson 1981: 106-111). Maratsos (1979) is also critical of the use of semantic roles in research on child language acquisition.

At this point, I will not comment on the analyses of the examples considered in this section in terms of the different hypotheses of semantic roles or thematic relations. My position in this thesis is that, given an adequate theory of semantic or ontological types, a theory of thematic relations is redundant. In Chapters 3 and 4 of this work, I will propose and support an alternative semantic analysis of elementary sentences containing 'be'. Then in Chapter 5, I will compare and contrast my analysis with one based on thematic relations in terms of explaining well-formed passives in English, acceptable question and answer pairs, and linguistic inference relations. I claim that there is little convincing linguistic evidence to support the use of labels such as 'Theme' and 'Location' in a formal analysis of categorical sentences.

The next task will be to adopt a syntactic analysis, i.e., a structural categorial description of elementary sentences containing 'be'. This is the subject of Chapter 2

Chapter 2

Syntactic analysis of categorical sentences

This chapter concerns the syntax of elementary sentences containing 'be' in English. My main objective here is to outline the syntactic notions and principles that are essential for an adequate description of subject-predicate relations. As a basis for explaining how speakers interpret these fundamental relations, it will be necessary to present a more detailed analysis of the phrases that function as the subjects and predicates of elementary sentences.

The structural analysis that I assume for well formed elementary sentences was diagrammed in 2 of the Introduction. Basically I will apply the generative system of syntactic analysis known as the "government and binding theory" (GB) (Chomsky, 1981, 1982). Chomsky (1982: 4) distinguishes two "perspectives ... in the study of grammer, one which emphasizes rule systems and the other, systems of principles." As I noted in 1.1, current GB research in grammar (especially syntax) focuses on the study of systems of principles. The tendency is to attempt to eliminate the rule systems in favour of "principles and parameters" of universal grammar (UG). (Chomsky 1986: 2). In general I agree with the thrust of the current research programme. In this chapter I will assume that lexical categories are defined by inherent lexical properties and that the principles of X-bar theory can account for the basic syntactic structure of elementary sentences. But I do not find that in every case the subsystems of principles are superior to the elements of the rule systems that they are supposed to replace. In particular, I will argue here against θ-theory in favour of strict subcategorization (which is a device taken from the traditional rule system). In section 2.1, I will argue that θ-theory is inadequate as a basis for the Projection Principle and the structural analysis of elementary sentences containing 'be'. (Furthermore, if θ-theory is equated with thematic relations, it is also inadequate as a basis for semantic interpretation, as I shall demonstrate in Chapter 5.)

I assume that the syntactic component generates well-formed sentences (S-structures) that serve as input to the interpretive components of the grammar. An important task for semantics is to determine how the meaning of a whole sentence is formed from separate conceptual structures that are

related to separate syntactic constituents of the sentence. The theory of linguistic semantics that is assumed in principle within generative grammar is a compositional interpretive semantics. According to the compositionality principle the meaning of a sentence is determined by the meaning of the lexical items it contains and sentence structure. More precisely, the sense of a given sentence depends upon the conceptual constituents that are associated with the individual lexical items it contains and the structural relations among the lexical items as defined by sentence grammar. Assuming the compositionality principle as a basis for working out the connections between form and meaning, it is crucial to make the notions underlying the syntactic linking of sentence constituents more explicit. For interpretation, the relevant structural relations among syntactic constituents include precedence and dominance relations. Following Katz and Fodor (1963) who outlined the first semantic theory in the context of (a) generative grammar, the rules of semantic interpretation are supposed to operate compositionally on phrase markers, from the bottom to the top of the phrase marker. Applying the compositionality principle to X-bar structures, lexical meanings would be assigned to each terminal element and then combined at the phrasal nodes, e.g., [XP,YP], [YP,I'], and so on, until an interpretation is assigned to the whole sentence (I").

Thus an essential part of the speaker's ability to interpret sentences of natural language is the prior ability to analyze these sentences syntactically. A basic working principle that I will assume in this work is the thesis of autonomy for syntax. In an autonomous syntax, as generative syntacticians often emphasize (e.g., Chomsky 1957: ch. 9; 1977: ch. 1; Culicover 1976: 45; Radford 1981: 12-13), only syntactic arguments are admissible for the justification of syntactic structure. Hence I will attempt to base the arguments presented in this chapter solely on syntactic evidence.

The first step of the analysis of elementary sentences containing 'be' is purely syntactic. The present chapter is in three parts. First, in 2.1, I will discuss the NP-VP structure of sentences and some alternative syntactic analyses of subject-predicate relations. Sections 2.2 and 2.3 will treat the internal structure of the subject and predicate phrases. The subject is analyzed configurationally as [NP,I"] and the predicate is analyzed as [VP,I']. The predicate phrase (VP) contains the lexical head 'be' plus an obligatory complement, which may be a noun phrase (NP), an adjective phrase (AP), a

prepositional phrase (PP) or another verb phrase (VP). In 2.2, the most substantial part of this chapter, I will investigate the question of the syntactic category of 'be'. I will argue that 'be' is a verb. In 2.3, I will present a syntactic analysis of the NP that functions as the subject of categorical sentences and the NPs, APs, PPs and VPs that may function as predicate terms.

2.1 The NP-VP subject-predicate structure of sentences

Given that *subject* and *predicate* are correctly analyzed as relational notions (as I have argued in 1.2.1), the next questions to answer are the following. For subject and predicate, what are the elements that are related? If NP and VP function respectively as the subject and the predicate of a sentence, as traditionally assumed, then what are the principles by which these phrases are generated and combined to form a sentence unit? The basic questions here concern the essential constituents of elementary sentences and their properties.

Within generative grammar, the principles of X-bar syntax are generally assumed to account for the internal structure of phrases and for structural generalizations across categories. All major phrases are analyzed as maximal projections of a particular lexical category X, which is called the "lexical head." Phrases (XPs) may contain phrases or other constituents that function as specifiers or complements of the lexical head. (For a detailed account, see Jackendoff 1977.) Given that general principles of X-bar syntax can account for the internal structure of phrases, according to Chomsky (1982, 1986) there is no need for specific phrase structure rules for this purpose. As part of the programme to eliminate particular rule systems in favour of principles and parameters of UG, Chomsky (1986: 3) states that "phrase structure rules can apparently be dispensed with entirely." In order to account for the overall structure of a sentence, he would extend the principles of X-bar syntax to clausal structures as well. If a sentence unit is assumed to be the maximal projection of the clausal category called "inflection" (INFL), the sentence unit being analyzed as IP, then a specific phrase structure rule such as 'S → NP INFL VP' is considered redundant. The structure of English sentences is illustrated by Chomsky (1983: 3) as follows.

$1\ S = I'' = [NP\ [_{I'}\ INFL\ [_{VP}\ V\ ...]]]$

For lexical categories such as V, "the choice of complements is supposed to be determined by the Projection Principle," according to Chomsky. This principle claims that representations at each syntactic level "are projections of lexical properties, such as the subcategorization frame and/or θ-marking capacity of the lexical head. The inherent features of INFL include [agreement] and [tense]. The [tense] feature presumably means that INFL requires a V constituent. It is further assumed that the NP specifier of the sentence (or of INFL) "is required by the Extended Projection Principle" (Chomsky 1986:4), which merely stipulates that all sentences require subjects (Travis 1984: 17) Chomsky suggests that this principle could be derived from "the theory of predication in the sense of Williams 1980, along lines suggested in Rothstein 1983." (Chomsky 1986: 92: n.4). In fact, Rothstein (1983) claims explicitly that her account of predication makes a phrase structure rule for the analysis of sentence structure redundant.

In this section I will briefly examine certain elements from the proposals by Williams and Rothstein concerning the syntactic structures underlying predication or subject-predicate relations. The data considered in both of these approaches are broader than the scope of my dissertation. This will not be an exhaustive review of either one of them.

One approach in the current literature would account for predication by coindexing. This procedure was introduced by Williams (1980) and has been adopted in principle by Cullcover and Wilkins (1984), Hornstein (1984), and others. The other approach, proposed by Rothstein (1983), establishes a rule of predicate linking, which is indicated by superscripting. While I agree with many points of these analyses, I find that neither is quite adequate as it stands to account for subject predicate-relations. In general, I shall argue that the representation of predication by coindexing is basically misleading, since this procedure is explicitly linked with co-referentiality Hence coindexing is inappropriate for predication, which is a different phenomenon. On the other hand, Rothstein's rule of predicate linking, which is not associated with co-referentiality, does not completely succeed either in eliminating the need of a phrase structure rule for the analysis of

sentence structure The problem is basically that Rothstein states her rules and principles in terms of relational notions, while the phrase structure rule is stated in terms of syntactic categories In connection with this, I would argue for the interpretation of the Projection Principle in terms of strict subcategorization rather than θ-marking Theta theory does not purport to account for the distribution of the predicate complements of linking verbs such as 'be' while subcategorization can account for all complementary terms, irrespective of their functions

The syntactic mechanisms that seem essential to account for sentence structure and subject-predicate relations, I claim, basically include the following X-bar theory, the inherent features of the head of a sentence and those of the heads of phrases, strict subcategorization, together with the Projection Principle, and general principles of compositionality For instance, I shall assume that the inherent features of INFL [tense] and [agreement] can account for the obligatory NP (subject) and VP (predicate) positions in the phrase structure illustrated in 1 above The [agreement] feature makes INFL a two-place relation, which could ensure that two lexical categories will be selected for well formed elementary sentences One of these obligatory lexical categories is assigned tense (in fact, it is finite) hence it must be V But why must the second category be N? Is there a reason that is connected with the inherent properties of INFL, i e , [tense] or [agreement]? Perhaps it could be established by considering which features of the relevant syntactic categories must agree with each other At least in English, agreement is required for the only feature that is overtly marked, which is number (singular or plural) The only two syntactic categories that are marked for number are N and V Since an elementary sentence may have only one phrase (VP) inflected for tense, the other syntactic category that is obligatory must be N I will assume that the linking of the maximal projections of the obligatory N and V categories is adequately represented by a hierarchical phrase marker or by labelled bracketing, at least for elementary sentences Predication is effected automatically by the maximal projection of INFL with its requisite specifier and complement phrases Now as for the claim that the subsystems of principles involved in predication can make certain rule systems (such as the PS rule for S and strict subcategorization) redundant, I will conclude here that the PS rule for the analysis of S may be considered redundant, but not strict subcategorization (It is

not certain that this account is actually more elegant than the simple phrase structure rule 'S →NP INFL VP', especially if we assume that these symbols are abbreviations for certain inherent properties. The main advantage is that we can account for the structure of S (IP) by principles of X-bar theory)

2.1.1 Predication by coindexing

We should expect a comprehensive treatment of predication to account for the relations between the expressions that function as subjects and predicates not only of sentences or main clauses (defined by Chomsky (1965: 71) as [NP,S] and [VP,S], respectively) but also those of "small clauses." (However, only the former, not the latter, are directly relevant for my dissertation. I will therefore be less interested here in the analysis of predication with respect to small clauses.) Williams (1980) adopts a rule of coindexing which would assign the same indices to the expressions that he analyzes as "subject" and as "predicate" according to his hypothesis. The rule states: "Coindex NP and X." (Williams 1980: 206). The "predication relation" is said to hold between the NPs and APs as underlined and coindexed in the following sentences.

1 (a) John$_i$ is sad$_i$

(b) John ate the meat$_i$ raw$_i$

(c) John$_i$ ate the meat nude$_i$

1 (d) John made Bill$_i$ mad$_i$

The main worry is that, as Culicover and Wilkins (1984: 23) explain, the adjective phrases in 1 (b-d) "would receive no interpretation since they would have no deep grammatical relations or thematic roles on their own and as they are not part of a constituent that has been assigned such relations." Williams (1980: 206) exemplifies that, besides an AP as in 1 above, a predicate can also be a NP, PP or VP, respectively. These are his examples, in which the predicates are underlined.

2 (a) John made Bill a doctor. (NP)

2 (b) John kept it near him. (PP)

(c) John died. (VP)

Williams does not say explicitly whether the analysis of VP as predicate (as in 2 (c)) would apply to all of the sentences in 1 and 2, but presumably it would. As for the analysis of the AP 'sad' as "predicate" in 1(a) where it functions as the complement of 'be', Williams may anticipate his (1984) analysis of the copula as auxiliary. (See 2.2.1 (1) for details.)

Other morphosyntactic reasons for postulating a procedure of "copular coindexing" are given by Hornstein (1984: 92-95). These include agreement of number and gender between the phrases that "flank the copula" in French and other languages. Here is an example from French.

3 (a) La vie$_i$ est belle$_i$

(b) Elle est beau (*)

One might also add agreement of case (nominative) for categorical sentences in German, e.g.,

4 (a) Er$_i$ ist mein Mann$_i$

(b) Er ist meinen/meines/meinem Mann (*)

Williams claims that the syntactic principles that apply in the procedure of predication by coindexing are the same as those of government and binding by movement. In other words, "the indices assigned by ... predication" are of the same type as those assigned by transformation (move α); i.e., they are "referential" (Williams 1980: 205). Here he would extend the notion of *co-referentiality*[1] to the predication relation. In particular he observes that "every predicate must have an antecedent." (Williams 1980: 205). In later works (Williams 1981; Travis and Williams 1982-83), the

[1] In generative grammar, coindexing procedures are often used to mark pairs of constituents in a sentence for co-referentiality. Phrases marked with the same index variable as in (a) below are assumed to be used by speakers to refer to one and the same entity; those with different indices as in (b) are assumed not to be used to refer to one and the same entity.

(a) Dale$_i$ knows herself$_i$

(b) Dale$_i$ knows her$_j$

The syntactic conditions for co-reference are studied in detail by Reinhart (1983).

antecedent, or the subject of XP, is defined as "the external argument" of XP, rather than internally with respect to a clause or XP, as defined by Chomsky (1965, 1981).

A syntactic condition of c-command on predication states: "If NP and X are coindexed, NP must c-command X or a variable bound to X." (Williams 1980: 206). Furthermore, the subject-predicate coindexing must hold at a separate level of representation called the *"predicate structure* (PS) of a sentence." (Williams 1980: 205). Like Williams, Culicover and Wilkins (1984) also adopt coindexing procedures. Their syntactic conditions underlying subject-predicate relations are defined in terms of "bijacency," which is similar to Williams' notion of *c-command.* In all cases, a predicate must be bijacent to its antecedent, i.e., the phrase analyzed as predicate must itself be a sister or be dominated by a sister of its antecedent, according to Culicover and Wilkins (1984: 25). They propose, however, that predication be defined at D-structure, rather than at a separate level such as the PS that Williams posits. For them, predication is a process that is defined by only one of <u>two</u> rules of coindexing. In other words, their rules of coindexing cover two domains. One set of rules coindexes NPs and "predicates," another, NPs and "dependents." They distinguish between cases of "true predication" (e.g., sentences 1 (a)-(c) above) and control of dependent complements (e.g., 1 (d) and 2 (b) above). Let us examine their definition of the term 'predicate' (Culicover and Wilkins 1984: 24-25).

> A *predicate* is any non-propositional major category X^{max}, immediately dominated by V^n, that bears neither a DGR [i.e., a deep grammatical relation such as subject, direct or indirect object—ems] nor a thematic role. ... A *proposition* is a verbal element together with its complete argument structure. An S (or S') is a proposition as it contains a verb and all its related thematic relations. The result of coindexing for predication is the creation (... the completion) of a proposition.[2]

By definition then a predicate for Culicover and Wilkins is the maximal projection of a lexical (non-propositional) category X that is dominated by V^n. Predicates include the complements of linking verbs

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[2] This notion of *proposition* is different from the one I assume. In my introduction, propositions were characterized as the "bearers of truth values." Clearly much more is required besides coindexing of NP and XP in sentences of the form [NP be XP] to complete a proposition. At least a referent must be assigned to NP and XP must be predicated of the referent. As Searle (1979: 55) claims, making a proposition, i.e., ascribing properties to a referent or referents, is a "speech act." For Culicover and Wilkins, a proposition is a purely linguistic entity.

such as 'be', while dependents are the complements of other classes of verbs, including 'believe', 'expect', 'force', 'hope', 'try', 'want', etc.[3]

In general, as it is analyzed here, predication involves relations between NPs (subjects) and attributive xPs (predicates), with or without a verb linking the subject and predicate phrases. Let us consider again the types of sentences for which Williams first proposed his hypothesis concerning predication and for which Culicover and Wilkins also provide an analysis.

1 (a) John$_i$ is sad$_i$

(b) John ate the meat$_i$ raw$_i$

(c) John$_i$ ate the meat nude$_i$

For sentences 1 (b) and (c), Culicover and Wilkins claim that the predicate phrases must be attached to different nodes of the VP, since 'raw' must be coindexed with the direct object while 'nude' must be coindexed with the subject phrase. The AP 'sad' in (a) would presumably bear the same relation to the subject 'John' as 'nude' does in (c). I have no criticism to offer concerning the various phrase markers that Williams (1980) or Culicover and Wilkins (1984: 33) would propose for the analysis of the sentences in 1 above. Rather, I will simply point out the general aspects of this approach that I find questionable.

I have two basic questions concerning the coindexing procedure applied to subject-predicate relations. First, for elementary sentences, it is not clear why a syntactic rule of coindexing ("Coindex NP and X, where X is a predicate." Culicover and Wilkins 1984: 25) is required for the representation of predication in addition to a phrase structure analysis of the sentence unit. Subject and predicate phrases are explicitly linked in phrase markers or labelled bracketing. In the context of my dissertation, a more serious charge is the following. I claim that the value of the coindexed

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[3]Culicover and Wilkins analyze bare infinitivals as VP complements of certain verbs rather than as sentential complements. They have no need of PRO as a syntactic construct in their theory, unlike Rothstein (1983: 155-156) who would analyze such embedded sentences as instances of clausal predication. Since the subject of my dissertation concerns only some cases of "true" predication (i.e., only elementary sentences containing 'be' and a "predicative," as described by Jespersen 1933: 124), I will not consider sentence types containing either embedded sentences or other verbs with infinitivals.

representations is limited because the coindexing procedure is used to represent several different phenomena at the same time. Thus the representation of sentences containing 'be' obtained by the coindexing procedure is especially problematical if it is expected to be taken seriously as a basis for semantic interpretation. Furthermore, what the coindices are said to represent in the theory of predication is questionable. For instance, the claim that the expressions that function as subjects and predicates are co-referential needs to be clarified. It is not at all obvious in what way the expressions 'John' and 'sad', for example, could be taken as co-referential, and anyone who makes the claim that they are should explain how it is possible. It could be that for a sentence such as 1 (a), if it were true, one could say that the referent of 'John' would be in the class denoted by 'sad', but this in no way implies that a speaker would be referring to John when uttering the expression 'sad'. Co-reference is supposed to hold between pairs of NPs, while the grammatical relation of predication is supposed to hold between NPs and any XP that is predicated of the referents of the NPs. (The claim that the adjective or AP 'sad' is "referential" at all needs to be explained. What is a "referring expression?" (cf., e.g., Jackendoff 1983 ch. 4). The question of the sense and reference of expressions that may function as subjects or as predicate complements is much too complex to consider at this time. In Chapter 4, I will explore this question in some detail. For the moment, the issue is the procedure of coindexing for predication.) If the same indexing device is to indicate both co-reference and predication, among other relations, the main problem is the sheer ambiguity of the representations. Furthermore, as Hornstein suggests, the procedure of coindexing may indicate other morphosyntactic relations as well, e.g., agreement of gender or case. But for semantics, if the representation is ambiguous (i.e., if the same symbols are used simultaneously to represent different phenomena), then it is unclear what value it can have for interpretation, much less as a basis for explaining "how meaning functions in natural language." (Hornstein 1984: 115). On the negative side, the representation of subject-predicate relations that results from the theory of predication by coindexing is misleading. But in its favour, the syntactic rule of coindexing has the advantage of being stated in terms of categorial structure, rather than in terms of the corresponding grammatical functions.

2.1.2 Rothstein's analysis

Compared to Williams and Culicover and Wilkins, Rothstein de-emphasizes the representation of predicate linking. However, she makes a sharp distinction between the phenomena of predication and co-referentiality as indicated by coindexing under the binding theory (Rothstein 1983: 107). Accordingly, she uses subscripting to indicate co-reference and superscripting for predicate linking. If successful, a syntactic analysis which recognized this distinction would automatically be preferable to Culicover and Wilkins' and Williams' as a basis for the semantic analysis of elementary sentences containing 'be'.

While Rothstein and Williams agree on certain details of syntax, she apparently sees no need for a separate level of syntactic structure for linking predicates with their subjects. Her rule of predicate linking (for English) applies at S-structure (rather than PS as posited by Williams or at D-structure as proposed by Culicover and Wilkins). Rothstein's rule claims that all predicates require subjects. More specifically, Rothstein wishes to express the requirement "that every syntactic predicate must be closed by being linked to an appropriate syntactic argument, its formal subject" (Rothstein 1983: 13-14). Her rule (Rothstein 1983: 27) is stated in two parts as follows:

> (a) Every non-theta-marked XP must be linked at S-structure to an argument which it immediately c-commands and which immediately c-commands it.
>
> (b) Linking is from right to left (i.e., a subject precedes its predicate).

Although it is not stated explicitly in the rule, a subject must be either NP or S, which are the only elements that can close a predicate. According to the first part of Rothstein's rule (1983: 27) the subject (NP) must c-command the predicate XP and the predicate must c-command the subject as well. Rothstein's definition of c-command is as follows: "α c-commands β if and only if every maximal projection dominating α also dominates β." In the relation of mutual c-command, α and β simply share all maximal projections. According to Rothstein, this principle accounts for the distribution of all non-argument XPs and, more important for her, it requires that clauses have phrases that function as

subjects, too. Given her rule of predicate linking, she asserts that a phrase structure rule for the analysis of S is redundant.

The following types of subject-predicate relations fall within the domain of Rothstein's rule of predicate linking. Subjects are underlined here and predicates are bracketed.

5 (a) John^{i} [gave Mary the book]$^{i}{}_{VP}$

(b) Bill^{i} [eats carrots^{j} [raw]$_{AP}$]$^{j}{}_{VP}$

(c) He^{i} [drinks tea^{j} [with sugar]$_{PP}$]$^{j}{}_{VP}$

(d) She^{i} [thinks him^{j} [a fool]$_{NP}$]$^{j}{}_{VP}$

Following Williams (1981), Rothstein would define a subject, not internally with respect to a clause or XP as Chomsky (1965, 1981) does, but as the external argument of a particular (non-argument maximal projection XP) phrase (Rothstein 1983: 130). Chomsky's subject of a sentence would be for Rothstein the subject of a VP or its external argument, which may be selected by the V head and assigned a θ-role. For convenience, Rothstein refers to VP-NP predicate-subject relations as instances of "primary predication" and adjunct-NP predicate-subject relations as instances of "secondary predication." In her dissertation, Rothstein details the syntactic conditions for both kinds of predication. Primary predication is essentially clausal or sentential, while secondary predication occurs in "small clauses." Next I will illustrate her definitions of *primary* and *secondary* predicates.

> Primary predicate: X is a primary predicate of Y if and only if X and Y form a constituent which is either theta-marked or [+INFL].

The following examples contain primary predicates (underlined), according to Rothstein's definition (1983: 162) and analysis. Sentences 6 (b)-(f) each contain two instances of primary predication. Except for 6 (a), I indicate only embedded instances.

6 (a) John is sad.

(b) That [John is late] is disturbing.

(c) John persuaded him [PRO to leave]

6 (d) I made [John leave]

(e) I considered [John (to be) a fool]

(f) We disliked [John's leaving]

The examples in 6 are taken from Rothstein (1983: 155-156). Her definition (Rothstein 1983: 167) of *secondary predicate* is as follows.

> Secondary predicate: X is a secondary predicate of Y if and only if Y is an NP theta-marked by a lexical head other than X and is dominated by S.

Rothstein distinguishes two classes of secondary predicates, called "resultative" and "depictive" predicates. Below are some of her examples (Rothstein 1983: 35). The secondary predicates are underlined. The example in 7 (a) is resultative and those in 7 (b) and (c) are depictive.

7 (a) John painted the car red.

(b) Bill ate the carrots raw.

(c) Tom met Mary drunk.

Resultative predicates apply to (the referent of) the direct object of a verb that denotes a change of state, e.g., 'paint'. This kind of predicate expresses a property that applies to its subject as a result of the action denoted by the main verb. Rothstein claims that there is a "close connection" between the main verb and a resultative predicate, which must always apply to the referent of a direct object. Depictive secondary predicates, as illustrated by sentence 7 (c), which is ambiguous, may apply to the referent of either the subject or the direct object of the main verb.

I will not examine the various syntactic structures that Rothstein proposes for these sentence types or comment on the way the notions of *change of state* and the *resultative-depictive* distinction would be correlated with syntactic structure.[4] Although I find this semantic distinction interesting, I

[4] There are undoubtedly semantic constraints on the applicability of secondary predicates to entities just as there are for primary predicability. There may be additional constraints in the case of secondary predication since it must occur in the context of another predicate. Rothstein's analysis does not purport to account for these semantic constraints and I will leave this issue for further research.

do not consider it to be directly relevant to the main topic of my dissertation. My problem concerns the semantics of elementary sentences containing 'be', and all of the examples of secondary predication discussed by Rothstein (or by Williams (1980) and Culicover and Wilkins (1984) for that matter) contain main verbs other than 'be'. Although elementary sentences containing 'be' are all instances of primary predication, according to Rothstein's hypothesis, it seems reasonable to maintain a distinction between primary and secondary predication that is comparable to hers. Generally speaking, I would prefer Rothstein's definition of *predicate* to that of Williams and Culicover and Wilkins. They consider the predicate of the sentence 'John is sad' to be only the AP 'sad'. Rothstein would consider the predicate of an elementary sentence containing 'be' to be parallel to that of a sentence containing the verb 'eat', for example. In her analysis, the predicates 'are carrots' and 'eats carrots' would have parallel syntactic structures and also the same relation of predication would hold between these predicates and their subjects. I agree completely with this aspect of her analysis.

The main difficulty I find with Rothstein's analysis of predication is partly the characterization of the notion of *subject*. Here I am not contesting its property of being "external" to the predicate phrase. For Rothstein, the subject of a primary predicate must be an "argument," while the subject of a secondary predicate X must be "an NP theta-marked by a lexical head other than X." In my view, *NP* is more appropriate as a defining property for a grammatical subject than *argument* is. The requirements of θ-marking or argument status of the NP are too restrictive, and as a consequence, Rothstein's treatment of post-NP predicate linking is incomplete. As far as I can tell, the main source of the difficulty is her use of θ-theory rather than the conventional system of strict subcategorization. Obviously syntactic positions for predicate complements, which may be obligatory, cannot be established by principles of θ-theory, though they can be established by strict subcategorization. Strict subcategorization provides a syntactic constraint, however, not a semantic one, although it has semantic implications. (See Chomsky 1965, 1981.) All items that appear in well formed syntactic strings must be interpreted. Predicate complements, as well as arguments, must be interpreted. Rothstein considers secondary predicates to be adjuncts. According to Jackendoff (1977: 57-61), adjuncts may function as restrictive or nonrestrictive modifiers of particular XPs. Thus, it

is not at all clear that secondary predication as described here is limited to certain classes of main verbs, as implied by Rothstein's analysis. They are certainly not limited in this way if secondary predicates are analyzed as restrictive or nonrestrictive modifiers.

To illustrate the problem, I will consider the question of whether or not sentences containing 'be' would permit secondary predication. Rothstein does not bring up this subject in her dissertation. However, I should note that her study of predication does not focus on 'be' and copula constructions. She devotes only two short sections to these topics (Rothstein 1983: 136-143). Given her syntactic analysis of secondary predicates as adjuncts, I would argue that it is surely possible to apply secondary predicates to the predicate complements of 'be'. Perhaps from a semantic viewpoint, one might choose not to call this phenomenon "secondary predication," but something like "predicate modification." The main point I wish to emphasize here is that both phenomena involve some of the same syntactic structures. In the following examples, the complements of 'be' are expressly indefinite. The secondary predicates (that modify the predicate complements) are underlined below.

8 (a) This is a cup of tea, boiling hot.

(b) That is a strawberry much too ripe.

(c) He is a new teacher learning how to compute grades.

(d) Max is a prisoner on parole.

For sentences containing 'be', the secondary predicate modifies the type denoted by the predicate complement. According to my semantic analysis of categorical sentences (for details see Chapter 3), the referent of the subject NP is said to belong to the type denoted by the predicate complement. Since the secondary predicate applies to the type to which the referent of the subject belongs (in case the sentence is true), the secondary predicate would automatically apply to the subject as well. Although an adjunct of the predicate complement of 'be' would not always satisfy the definition of secondary predicate as proposed by Rothstein, it nevertheless shares some syntactic attributes with depictive secondary predicates. For instance, all of the secondary predicates (or predicate modifiers) underlined in (8) above may be correctly (grammatically) linked to the predicate complement of 'be'

by constructing appropriate relative clauses containing a form of 'be'. And whatever is denoted by the direct object of 'eat' or the predicate complement of 'be' may be questioned in the same way. Consider the following examples.

9 (a) Bill ate the carrots raw.

(b) Bill ate the carrots that were raw.

(c) Bill ate what raw?

(d) What did Bill eat t raw? The carrots.

10 (a) This is a cup of tea, boiling hot.

(b) This is a cup of tea that is boiling hot.

(c) This is what boiling hot?

(d) What is (this) boiling hot? A cup of tea.

11 (a) That is a strawberry much too ripe.

(b) That is a strawberry that is much too ripe.

(c) That is what much too ripe? (?)

(d) What is (that) much too ripe? A strawberry.

Of course there are some systematic differences between the syntactic behaviour of NP direct objects of relational (two-place) verbs and NP predicate complements of 'be'. For instance, the predicate complement of 'be' can never come to function as the subject of a passive sentence. However, the observation I wish to emphasize here is simply this. From a structural viewpoint, an NP that functions as the direct object of 'eat' may be identical to an NP that functions as a predicate complement of 'be'. The direct object of 'eat' would be analyzed as an argument, while the predicate complement of the copula 'be' would be a non-argument. Rothstein's syntactic analysis of predication is directed toward the dichotomous functioning of NPs as arguments or as non-arguments rather than toward the common syntactic structure that all NPs potentially share. Her account of subject-predicate relations is stated in functional terms. As a result, it naturally misses some syntactic generalizations. Above

all, the analysis fails to account for the fact that it is possible to apply secondary predicates to predicates or to predicate complements as well as to arguments.

Although it is certain what Rothstein's hypothesis would predict with respect to the sentences in (8), it is not certain exactly how she would analyze them. She considers that there are two lexical items 'be' There is a 'be' of identification or identity (a verb) that assigns two θ-roles and the copula 'be' that assigns no θ-roles. Since secondary predicates must be linked to argument XPs that are assigned θ-roles, according to her hypothesis, 8 (a-d) could contain secondary predicates only if 'be' were analyzed there as the 'be' of identity (Rothstein 1983: 136-138). I am not sure that Rothstein would in fact analyze these sentences as identity propositions. I would not do so myself. However, I am unable to distinguish between the verb 'be' that is said to assign two θ-roles and the one that is said to assign none. Therefore, I do not see how this part of Rothstein's hypothesis could be falsified. It does not give clear criteria by which to distinguish between the predicate complement of a copula and the θ-assigned object of the verb 'be' of identity. (The conceptual analyses of 'be' as "equative" or "predicative," among others, will be discussed in Chapter 4)

Although I would support many aspects of Rothstein's approach to the analysis of primary and secondary predication and her notions of *subject* (in part) and *predicate*, I do not believe that her principle of predicate linking succeeds as it stands on its own. Rothstein's rule of predicate linking is said to complement the θ-Criterion. The latter would account for the distribution of argument NPs, while the former would account for the distribution of predicate XPs. Do these two principles together account for the well-formedness of sentences to the extent that a phrase structure rule, such as 'S → NP INFL VP' is redundant, as Rothstein claims? This has not been demonstrated conclusively. Although her analysis sometimes requires INFL' in sentence strings, she analyzes it neither as the head of S nor as part of an XP. In fact, she claims that S is not the projection of any category (Rothstein 1983: 18) But it seems that Rothstein may be attempting to get too much for free. To specify the well-formedness of a sentence, it is not sufficient to declare that predicates need arguments and that arguments have θ-roles. What seems necessary as a first step is to have a string of lexical items to which the terms 'argument' or 'predicate' could apply. The main problem is that Rothstein's rule of predicate linking

presupposes that a well formed string contains a "non-theta-marked XP" that functions as predicate (Rothstein 1983 27) But she does not propose a mechanism that would guarantee that strings do have XPs that could function as predicates or Xs that are capable of assigning θ-roles Theta-roles that are listed in the lexicon must be assigned by syntactic principles But the θ-Criterion is designed to account for argument XPs, not for predicates Since strict subcategorization is apparently not assumed Rothstein's hypothesis could not rule out ungrammatical strings such as the following

14 (a) It is (*)

(b) It's (*)

(c) It is hardly (*)

(d) It is not only (*)

Assuming INFL as the head of S, with its NP specifier and VP complement obligatory, then strict subcategorization, along with the Projection Principle, would ensure that predicate XPs occur in well formed sentences containing 'be', as a prior condition for predicate linking Subcategorization is necessary not only for copular verbs like 'be', 'seem', etc , but also for other classes of verbs that strictly subcategorize for predicate complements These complements, like some direct or indirect objects, may be optional, as illustrated here for sentences containing 'elect'

15 (a) They elected him (president)

He was elected (president)

(b) They consider him (to be) sophisticated

He is considered (to be) sophisticated

He is considered (*)

Even when it is omitted, an optional complement would be implied anyway For instance, if someone were elected, she/he would be elected as something. If someone were considered, she/he would be considered as something, for something or to be something else

I will conclude this section by noting that my dissertation concerns elementary sentences containing 'be' which are always instances of primary predication. I have nothing further to say in

this work about the notion of *secondary predication*. The syntactic analysis that I will propose in the remainder of this chapter assumes the device of strict subcategorization, which, with the Projection Principle, will ensure that subcategorized phrases (whether they function as arguments or as predicates) are present at every level of syntactic structure. I will assume none of the principles of θ-theory, but, given INFL as the head of S and strict subcategorization, I would suggest that it is θ-theory that is redundant.

2.2 Syntactic category of 'be'

The syntactic categorization of any expression involves at least three interrelated issues. The primary question concerns its inherent syntactic properties. According to traditional grammar as well as generative grammar, the inherent category of any given lexical item can be determined strictly on the basis of distributional criteria. That is, lexical categories are taken as substitution classes which can be verified by paradigmatic substitution tests. The procedure is based on a principle which may be expressed roughly as follows:

> Two lexical items belong to the same syntactic category if and only if one can be replaced by the (corresponding grammatical form of the) other in any sentence preserving sentencehood, i.e., the result being itself a grammatical sentence.[1]

Related questions concern the relative independence of the expression (as evidenced by movement and anaphoric relations) and dominance relations with respect to other categories that may co-occur within the same hierarchical phrase structures. In some versions of generative grammar, the structural positions (both linear and hierarchical) of a lexical item are assumed to be stipulated by recursive phrase structure rules which refer to its syntactic category (or more precisely to the inherent properties that define the syntactic category). For instance, the major lexical categories are defined in terms of the features [N] and [V]. The category noun is defined as [+N, -V], verb [-N, +V], adjective [+N, +V], and preposition [-N, -V]. In any case, the usual way to account for the potential structural position of a given expression in a sentence is to determine its syntactic category. Certain

[1] This principle is based on Hiż (1960: 311), who attributes the basic idea to the German philosopher Husserl.

morphological rules, especially those involving inflections, are generally assumed to apply to the lexical items that belong to the same syntactic category. Categorization is clearly an essential part of the morphosyntactic description of any expression. The element 'be' is no exception. This section will focus on the syntactic category of 'be'. As it happens, in current linguistic descriptions of English, the syntactic category of 'be' is a controversial point.

The relevant morphosyntactic data concerning (the forms and distribution of) 'be' in English sentences have been carefully collected, catalogued, described and elaborated by traditional grammarians. Judging from their descriptions, the syntactic analysis of elementary categorical sentences containing 'be' is not as simple a matter as it might appear at first sight. To begin with, the linguistic description of 'be' itself seems especially complex. It is complicated by the fact that apparently the same set of morphological forms can function in English sentences as either an auxiliary verb or as a full verb, as these functions have been described traditionally. In morphophonological terms, 'be' appears to be completely irregular except for its -ing form 'being' and the past participle 'been' "which belongs to the -en formation." (Palmer 1974: 154). Five morphosyntactic forms have been identified for the "normal" verb in English i.e., presumably there are at least five different structural contexts requiring verbs (which may or may not vary in form). On the other hand, 'be' has eight different forms. These are: base form and/or infinitive: '(to) be'; present: 'am', 'are', 'is'; past: 'was', 'were'; present participle: 'being'; past participle: 'been' (These forms and their typical functions are summarized by Quirk, Greenbaum, Leech and Svartvik 1972: 70-71.) Palmer (1974: ch. 6), demonstrates that the full verb 'be' has exactly the same forms as the auxiliary 'be'. Thus the postulation of separate lexical items for 'be' would not be defensible solely on the basis of morphophonological forms.

These morphosyntactic data have also been studied extensively within generative grammar since the very earliest descriptions of the auxiliary and the English verb system. (See, e.g., Chomsky 1957, 1965; Cullicover 1976; Jackendoff 1977.) In current linguistic descriptions of English verbs and the auxiliary system within generative grammar, the general tendency seems to be to postulate two

lexical items 'be', one dominated by Aux,[2] the other by VP This is the analysis proposed by Akmajian and Wasow (1975), e.g., developed by Akmajian, Steele and Wasow (1979), and extended recently by Lapointe (1981), among others, in the context of Bresnan's Lexical Functional Grammar In the same framework, Falk (1984. 484), argues for one lexical item 'be', including all forms and uses of 'be' except the "modal" 'be' that takes an infinitival as complement. Thus, he distinguishes between two categories of 'be': modal and verb. Alternatively, Williams (1984) posits two lexical items 'be', Aux and main verb (MV), which he distinguishes on semantic as well as syntactic grounds In another alternative approach, Pullum and Wilson (1977) argue on the basis of purely syntactic criteria that modals and auxiliary verbs are basically just verbs. They claim (1977· 742) that "the main-verb analysis of the aux is correct," agreeing fundamentally with Ross (1969). Gazdar, Pullum and Sag (1982) revise and extend this analysis within the framework of Generalized Phrase-Structure Grammar.

Although several different hypotheses are available, the categories that are usually considered possible for the analysis of 'be' are not unlimited. In sum, 'be' is analyzed either as an auxiliary verb (or sometimes a modal) or as a full verb, or both as an auxiliary verb and a full verb, or it is simply put into a special verbal class by itself, a very restricted class labelled "copula." (Chomsky 1965: 72) Alas, there is no general consensus on this subject in current linguistic literature. Because of the variety of the theoretical frameworks involved, it would not be very fruitful for my purposes to attempt to review all of the analyses proposed in the literature referred to above. In this section, I shall look briefly at representative alternatives to the categorization of 'be' and the tools and techniques of analysis that are said to be required for this task.

The position that I will adopt and defend in this work is that 'be' belongs to the lexical category verb (V). Essentially this idea seems quite unexceptional. It is certainly consistent with all of

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[2]The auxiliary system is the subject of several current research projects in linguistics. Akmajian, Steele and Wasow (1979) identify notional bases for the category Aux. Across languages, Aux is said to express only tense, aspect, modality, negation, question and emphasis, assertability conditions. In *The Encyclopedia of AUX* (1981), Steele *et al.* use the category Aux to exemplify research methods in the cross-linguistic analysis of syntactic categories and their justification. Various aspects of the analysis of the so-called "auxiliaries" from different approaches are reported in a two-volume anthology entitled *Linguistic categories: auxiliaries and related puzzles...* (1983).

the analyses I have examined. For whether it is analyzed specifically as a copula, a modal, or an auxiliary verb, the verbal qualities of 'be' are always recognized. In fact, I would conclude that none of the analyses mentioned above is fundamentally wrong. Analyzed as a single morphological class, 'be' in certain forms indeed exhibits characteristics of modals, of auxiliary verbs, or of full verbs. And it is always a copula. These are all characteristics of 'be'. But this global characterization is clearly not precise enough for syntactic analysis. Although all verbs may be described syntactically in terms of their distribution and their complements within the VP, according to Bach (1974: 92),

> ... quite independently of whether they are in the past or present tense, whether their subjects are singular or plural, or whether they occur in the progressive (*be + ing*), perfect (*have + en*) or with modal verbs (*can, must, will, may*),

such an abstraction is valid only for the analysis of a verb as it functions with respect to its complements. For a complete description of the external distribution of 'be', or of any verb, it is necessary to consider the various morphological forms that represent different tenses and/or aspects.[3] Although it is true that 'be' in some forms has the same distribution as other modals or auxiliary verbs, in other forms it occurs in the same positions as full verbs. Owing to this complication, an important task of my project is to determine how many lexical entries are required for an adequate description of 'be' I assume that in the lexicon of the grammar of English, each lexical item represents one sound-meaning correlation. What I refer to here as a "lexical item" is sometimes called a "lexeme." (Lyons 1977: 18-25). If 'be' were a single morphological verb or verbal lexeme that had one form (or set of forms) and one meaning (or a coherent range of meanings), then ideally, it should have a single lexical entry in the grammar of English.

My thesis here is that 'be' is a single lexical item. The problem in this section is to chose the most appropriate morphosyntactic devices to account for the various forms of 'be' and their characteristic distributions. In section 2.2.1, I will review the main arguments advanced to support the alternative analyses of 'be' as two lexical categories: (i) auxiliary and full verb, and (ii) auxiliary and copula. Also of interest to me are the various grammatical devices that are supposed to account for

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[3]Here I adopt certain descriptive techniques employed by Morin (1985), illustrating that morphological forms are relevant in accounting for the distribution of verbs in French.

the relevant morphosyntactic facts. I will show that the distribution of the finite forms of 'be' corresponds to that of both auxiliaries (i.e., modals) and other finite verbs, while the distribution of the non-finite forms of 'be' corresponds to that of the non-finite forms of other full verbs. In section 2.2.2, I will argue that there is only one lexical item 'be' and it is basically just a verb, as suggested by Ross (1969), Pullum and Wilson (1977) and Gazdar, Pullum and Sag (1982). I will support the analysis of 'be' as a member of the category verb and strict subcategorization as an appropriate device to account for its distribution and dominance relations with respect to its complements.

2.2.1 Alternative syntactic categorizations of 'be'

In this section, I shall briefly examine two alternative approaches to the categorization of 'be' within generative grammar. The hypotheses that I will consider are the following: (i) that there are two lexemes 'be', auxiliary and full verb, as proposed by Williams (1984), and (ii) that the verb 'be' belongs to a separate category copula, as proposed by Chomsky (1965). The topics treated in the works examined here are broader than the scope of my dissertation. From each, I shall extract only what seems directly relevant for the categorization of 'be' and the grammatical devices that are considered to be essential in accounting for it. Although I agree with the substance of both analyses, I do not find either representation to be ideal.

(i) Williams' (1984) analysis of 'be' Aux and 'be' V. In the context of describing 'there'-insertion sentences, Williams (1984) analyzes 'be' in English as two separate lexical items. What he claims that is unique concerning 'be' is that the 'is' that occurs in sentences of the following types is an auxiliary (Aux).

1 (a) There is a fly in the marmalade.

(b) She is clever.

(c) He is my cousin.

(d) The calèche is in the car park.

(e) He is weeping.

In addition to the Aux 'be' illustrated in 1, Williams claims that there is a full verb 'be' The two 'be's are contrasted in the following sentences; both of them occur in 2 (b).

2 (a) John [is]$_{Aux}$ obnoxious.

(b) John [is]$_{Aux}$ [being obnoxious]$_{VP}$

Certain aspects of Williams' analysis are difficult to assess. For instance, he does not state explicitly which forms of 'be' (other than 'is' and 'being' that appear in his examples) belong to the category Aux and which forms belong to V. That is, it is not clear from what he writes whether he thinks that each of the two 'be's has eight different morphological forms or that each one is defective, containing only a subset of the eight available forms of 'be'. He does claim that there are <u>two</u> lexical items 'be' (personal communication). What is also clear is that, according to his hypothesis, 'is' in 1 and 2 above belongs to the syntactic category Aux, while 'being' in 2 (b) belongs to the syntactic category "main verb (MV)."[4] Now Williams claims that 'be' V, unlike 'be' Aux, "ascribes intentionality to its subject." In fact, it is on the basis of this criterion that the two 'be's "are easy to tell apart." (Williams 1984: 141). However, Williams' analysis of 'be' in English can be shown to be mistaken on semantic grounds. (His semantic arguments for the distinction between the two 'be's will be discussed in 4.3.) Williams compares his syntactic analysis to other treatments of 'be' and 'there', e.g., Akmajian and Wasow (1975), Akmajian, Steele and Wasow (1979), and Jenkins (1975), but his differs in certain respects from all of the others. (For details, see Williams 1984.) His syntactic categorization of 'be' challenges more traditional analyses and the consequences for grammatical description are certainly worth considering.

Williams' (1984) rule for the analysis of sentence structure is stated as follows: 'S → NP Aux XP', where X can be any major category, N as in 1 (a) or (c), A as in 1 (b), P as in 1 (d), V as in 1 (e). This rule is more general than the rule that is usually assumed, namely, 'S → NP Aux/INFL VP'.

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[4]Williams (1984) uses the term 'main verb', abbreviated 'MV'. Since this term is ambiguous (it is often used to refer to the head of the VP immediately dominated by the highest S), except in quotations, I shall use the terms 'full verb' or simply 'verb', abbreviated 'V', to refer to the syntactic category verb.

According to Williams' phrase structure rule, all sentences (S) must have an NP subject, an Aux, and a predicate XP but XP is not necessarily a VP This is actually the most interesting syntactic consequence of Williams' analysis His description obscures, without denying, the fact that V (either Aux or V) is obligatory However, in the syntactic analysis that I assume the sentence unit has no Aux node such as the one that Williams describes but it must have a V as required by INFL, which I claim is a [+finite] verb position Hence, a sentence must have a VP Basically I tend to agree more with the traditional analyses of 'be' as a full verb under the VP, as proposed by Akmajian and Wasow (1975), e.g., but not with a two-lexeme analysis Therefore, my main task here will be to show that the finite forms of 'be' as employed in the sentences in 1 above do not belong to a category Aux as described by Williams.

First I will examine the evidence for a formal distinction between 'be' employed as a full verb (V) and 'be' employed as an auxiliary (Aux) It is important to notice how Williams (1984 139) describes the Aux

> Essentially, Aux (the classical Modal-*have-be* sequence of verbs) is the head of S, so wherever Aux occurs, S is present, and wherever there is an S, there is Aux (or at least the possibility of Aux, since Aux can be null)

Although Williams does not say so explicitly, his analysis seems to agree fundamentally with Chomsky s original phrase structure rule for Aux (1957 111, 1965 107) "Aux → T (M) (have + en) (be + ing) " This rule and the transformation of "Affix-hopping," were supposed to account for the surface order of the elements listed. Tense (T) is the only element in the series that is obligatory, though it never occurs as a separate element in English. Williams writes (1984: 136)

> Of course, for any choice of Aux other than *be*, XP will always be VP, since *be* is the only Aux that subcategorizes for any category other than VP. And if no Aux is chosen, XP must be VP, since there must be at least one verb (main or auxiliary verb) for the realization of Tense.

Besides the phrase structure rule for S, another device that Williams assumes is strict subcategorization He does not, however, use subcategorization to distinguish between Aux and V, as

one might do in a traditional analysis.[5] The subcategorization frame for 'be' is obviously different from that of any other Aux. But what are the syntactic criteria (distributional or functional) that Williams uses to establish the category Aux?

In Williams (1984), as far as I can determine, 'be' is assigned its syntactic category Aux merely "by stipulation." For distinguishing the two 'be's as in 2 (b), the only distributional criterion that I can find is the following: "Since there are two *be*'s, the second one must be MV *be* " (Williams 1984: 141)[6] But these criteria hardly seem sufficient on their own to establish the syntactic category of either *be* (V or Aux). Williams inevitably links his categorial analysis of 'be' to the phrase structure rule that he proposes for the expansion of S, as described above. The only evidence that he offers in support of this phrase structure rule is data involving VP Deletion,[7] which he generalizes as "XP Deletion " Williams (1984: 136) observes "that the following sentences are all parallel in structure" and would illustrate his rule 'S → NP Aux XP'

3 (a) John - will - leave [NP Aux VP]

(b) John - is - sick [NP Aux AP]

(c) John - is - a fool [NP Aux NP]

(d) John - is - leaving [NP Aux VP][8]

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[5] In traditional analyses of English, one of the defining characteristics of the auxiliary verb (which is implied by the very name of the category) is that it always supplements a full verb. The occurrence of an Aux indicates that a full verb is to follow. A formal distinction between auxiliary verbs and full verbs could be stated in terms of their subcategorization frames. An Aux can occur only in the context of VP, whereas a V takes as a complement the maximal projection of one of the following lexical categories: N, A, or P.

[6] This formal criterion is however inconsistent with Williams' semantic hypothesis, as this would then count *being* in passive sentences of the form 'S is being V'ed' as a V. In that case, the subject NP would not denote an "intending" being. See 4.3 for further discussion of his semantic criteria

[7] This phenomenon is also called "ellipsis" (Quirk, Greenbaum, Leech and Svartvik 1972: ch 9) or "gapping." Ross (1970: 250) describes gapping as the deletion of "indefinitely many occurrences of a repeated main verb in conjoined structures." Deletion is thus a device for reducing redundancy in compound sentences. Deletion is used primarily to avoid repetition, and in this respect, it is similar to the substitution of proforms for a given constituent.

[8] Williams' example (30d) (my 3 (d)) has the analysis "NP Aux NP" (1984: 136), which may be a typographical error.

(e) There - is - someone sick [NP Aux NP]

He argues that the process of XP Deletion "treats all of these constructions . as parallel," as illustrated in 4.

4 (a) John will leave and Bill will ___ too.

(b) John is sick and Bill is ___ too.

(c) John is a fool and Bill is ___ too.

(d) John is leaving and Bill is ___ too.

(e) There is someone sick and there was ___ yesterday too.

Furthermore Williams (1984: 137) claims that "VP Deletion does not delete XPs from any position other than post-Aux position." But if so, then some forms of 'be' can be seen to have the same distribution as V rather than Aux, as in the following examples. The sentences in 5 are analogous to 4 (a)-(d) above.

5 (a) John will be leaving and Bill will (be) ___ too.

(b) John has been sick and Bill has (been) ___ too.

(c) John had been a fool and Bill had (been) ___ too.

(d) John is being obnoxious and Bill is being ___ too. (*)

If their XP complements are deleted, then the base progressive 'be' in 5 (a) and the past participle 'been' in 5 (b) - (c) are also optionally deletable. If XP Deletion operates only in the post-Aux environment as Williams claims, then, for the sentences in 5, 'be' and 'been' and 'being' cannot be analyzed as Aux but must be analyzed as members of the V category. For these cases it is difficult to see how Williams could keep his characterization of Aux as the "Tense-Modal-have-be" series and at the same time describe XP Deletion as a post-Aux operation. But his syntactic criteria include the constituency of Aux, post-Aux XP Deletion, and the subcategorization requirements of the members of the Aux category. Taken altogether, these criteria lead to conflicting predictions. For the sentences in 5, the following alternative analyses, among others, are possible.

6 (a) John - will be - leaving [NP Aux VP]

(b) John - has been - sick [NP Aux AP]

(c) John - had been - a fool [NP Aux NP]

(d) John - is - being obnoxious [NP Aux VP]

7 (a) John - will - be leaving [NP Aux VP]

(b) John - has - been sick [NP Aux VP]

(c) John - had - been a fool [NP Aux VP]

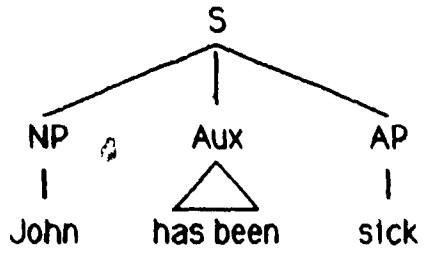
(d) John - is - being obnoxious [NP Aux VP]

Only the analysis in 6 would be consistent with Williams' claim that the copula is an Aux (Williams 1984: 131)[9] and his generalization of VP Deletion as XP Deletion. The analysis in 7 would be consistent with his claim concerning the subcategorization requirements of the other members of the Aux category, i.e., if 'will', 'has', 'had', are considered to have their own subcategorization requirements. As quoted above, Williams claims that for any choice of Aux other than 'be', a VP complement is required.

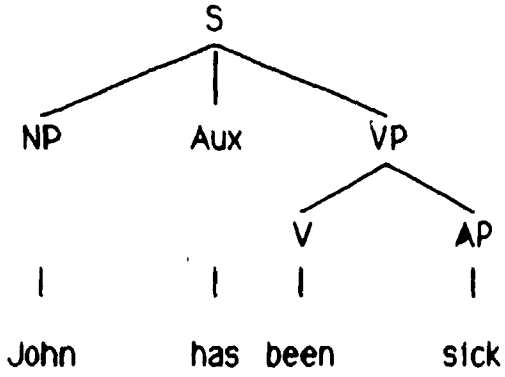
Williams explicitly rejects the analyses proposed by Akmajian and Wasow (1975) and Jenkins (1975) in which 'be' is dominated by VP, as illustrated below in 7 (b). However, 7 (b) seems less problematic to me than 6 (b). The analysis in 6 seemingly obliterates the morphological relations between various forms of copular 'be' and, by the same token, it implies that different syntactic relations hold between the different forms of 'be' and their complements.

[9]Actually the following is the only analysis for the sentences in 6 and 7 that would be completely consistent with the claim that the copula 'be' is an Aux: [NP Aux Aux XP]. For 'be' is always a copula and each sentence above contains a verb that functions as an auxiliary plus 'be'.

6 (b)



7 (b)



For instance, in the analysis in 6, the AP 'sick' would be immediately dominated by S, whereas in 7, it would be immediately dominated by VP. But a basic distinction between the sentences in 3 and those in 5-7 is that the ones in 3 are in the simple present tense, hence the verbs are finite, and those in 5-7 each contain both finite + non-finite verbs.[10] Generally it is assumed, however, that different tenses or aspects of a verb have no bearing on its dominance relations over its complements (Bach 1974: 92). But in the analysis proposed by Williams, perhaps the XP position that is an obligatory part of sentence structure would depend not only upon the subcategorization of Aux but also on the phrase structure rule for S.

Let us consider next the interaction of these two important grammatical mechanisms in Williams' analysis, i.e., the strict subcategorization system and his PS rule for the analysis of the

[10]This structural analysis could perhaps be justified if, as it predicts, the XPs could be shown to have a different distributional behaviour for simple as opposed to compound forms of 'be'. No such evidence is presented, however. If the predicate complement could be acceptably focused, then sentences with either form of 'be' would permit clefting and pseudo-clefting.

(i) It is a professor that John is now/has been all these years, not a lecturer.

(ii) A professor is what John is now/has been all these years, not a lecturer.

Apparently such sentences as these are not judged grammatical by all speakers of English (cf. Quirk, Greenbaum, Leech and Svartvik 1972: 952).

sentence unit (S). As for subcategorization, Williams assumes that the so-called "auxiliaries," like other verbs, have their subcategorization requirements stipulated in the lexicon. Although the subcategorization frames for 'be' Aux and 'be' V would be the same, since the syntactic categories would be different, different nodes would dominate 'be' Aux and 'be' V. If indeed it is Aux that determines XP, as Williams suggests, then the structure of a sentence could be like 6 (b) rather than 7 (b) above. According to traditional assumptions concerning subcategorization, if a constituent is required by the subcategorization frame of a given category, then the subcategorizing constituent and the subcategorized one should be syntactic sisters in phrase markers (Jackendoff 1977: 57-61.) But notice the symmetry in 6 (b) between NP and XP. In the GB framework, the XP complement would be distinguished from the NP subject in terms of its dominance relations with respect to 'be'. Only the XP would be sister to 'be', which would c-command and govern it (Chomsky 1982: 36).

Although phrase structure rules and subcategorization may be conceived of as independent grammatical devices, their effects are easily confused in the analysis of data. Williams does not explicitly delineate the relative domains and tasks of these two devices. As a consequence, his phrase structure rule for S could have been influenced by the subcategorization frame for the 'be' he analyzes as Aux.[11] The important question that remains is to choose the most appropriate mechanism to account for the distinction between 'be' Aux and 'be' V, which in any case have the same subcategorization frame. Since the categories of obligatory complements vary from one lexical item to the next, subcategorization may be more appropriate than a phrase structure rule for handling information of this type. If so, the various (XP) complements of 'be' Aux (or of 'be' V for that matter) need not be specified by phrase structure rule. Given certain assumptions that Williams accepts, e.g., that Aux (or INFL) is the head of S and the possibility of stating the subcategorization requirements of models, auxiliaries and verbs all in the lexicon, I would argue that a phrase structure rule for S is redundant. Or at most, all that must be accounted for is the fact that sentences have subject NPs and an Aux (or INFL). (See 2.1 and 2.2.2 for more details.)

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[11] In fact, I shall adopt part of Williams' phrase structure rule for S as the subcategorization frame for the single lexeme 'be' of my analysis.

Finally, it is necessary to choose between Aux (as described by Williams) and INFL (unless they are equivalent) as the head of a sentence. I will argue for INFL over Aux. It is arguable that Aux as traditionally analyzed plays no significant role in the syntax of English (Jackendoff 1972, 1977; Pullum and Wilson 1977). That is, the whole series of verbs that Williams would analyze as Aux is not in fact an element that moves independently in English or that could function as the head of a phrase or a sentence unit. In many types of elliptical sentences, it is only the first element of the "classical" Aux that is not deleted. Such sentence types include tag questions and compound sentences containing the phrase '... and so ...'. These constructions also involve the phenomenon that is usually described as "Subject-Aux inversion." The sentence types containing 'and so' furnish two of the main criteria that are used to define the category of auxiliary verbs: "Subject-Aux inversion" and VP (or XP) Deletion, as described above by Williams or if 'so' is analyzed as pro-VP. Another criterion is that auxiliaries have negative forms ending in 'n't'. These defining characteristics for English are displayed in the following sets of sentences. There is only one verbal element that functions as "Aux" in these processes and this element is finite. Finite verbs employed grammatically as Aux are underlined here. When full verbs or two or more auxiliary verbs are substituted in the same position, the sentences are ungrammatical, as indicated by the asterisks (*).

8 (a) Subject-Aux inversion in question formation.

Should he hit the ball?
Did should he hit the ball?(*)
Has he been hitting the ball?
Has been he hitting the ball?(*)
Will he have hit the ball?
Will have he hit the ball?(*)
Did he hit the ball?
Hit he the ball? (*)[12]

(b) Post-Aux deletion of VP in compound sentences: S and so S

He should hit the ball and so should she.
He should hit the ball and so should do she (*)

[12]This differentiation between auxiliary and full verbs is valid for English, but not for all languages. In German, e.g., any finite verb may occupy the "second" position in elementary sentences. For this reason, some linguists (e.g., Palmer 1974: 207) consider that the properties illustrated here are irrelevant for the Aux-V distinction since they are "idiosyncratic" to English.

He had been hitting the ball and so had she
He had been hitting the ball and so had been she (*)
He hit the ball and so did she
He hit the ball and so hit she (*)

(c) Enclitic of negation attached to the Aux

He shouldn't hit the ball
He hasn't hit the ball
He wasn't hitting the ball
He didn't hit the ball
He hitn't the ball (*)

Linguists often employ such tests to show that 'be' can also function as an auxiliary verb (See, e.g., Palmer 1974: 18-29). For these sentence types, the modal position is often identified as "the first auxiliary" (Jackendoff 1972, 1977). This position must be filled by a finite verb. Modals ('can','will' 'do', etc.) do not have non-finite forms. Likewise, only the finite forms of 'be', i.e., the simple present and past forms, could substitute for modals or finite forms of 'do' in Aux. Only in these simple forms can 'be' function as a pro-form for VPs in reduced sentences. When finite 'be' is the first or only verb in a sentence its syntactic behaviour is identical to that of other auxiliaries (modals, 'do' or 'have') as the first (finite) verbal element in a sentence. Therefore, it seems that only these forms of 'be' could be correctly categorized as Aux. There are, however, characteristics that are shared by 'be' Aux and 'be' V. For example, "they do not occur with DO". Exceptions are noted for the imperative: "Don't be obnoxious." "Do be polite." (Palmer 1974: 153). Otherwise, unlike any other lexical verb, 'be' V does not require or accept "DO-support," as illustrated by the following examples. For sentences containing auxiliaries and verbs of any type, one argument in favour of separating the first element of Aux from the other verbs in the series is the possibility of inserting adverbial phrases between them, as in the following examples (Jackendoff 1972, 1977). Similarly adverbial phrases and negative elements may occur between 'be' and XP, as illustrated in 9 (c).

9 (a) Subject-Aux inversion in question formation

Is he a student?
Was he a student?
Did was he a student (*)
Has he been a student?
Has been he a student (*)

Did he be a student (*)

(b) Post-Aux deletion of VP in compound sentences: 'S and so S'

He is a mathematician and so is she.
He is a mathematician and so does she (*)
He was a mathematician and so was she.
He has been a mathematician and so has she (been)
He has been a mathematician and so has been she (*)
He had been a mathematician and so did she (*)

9 (c) Adverb insertion between Aux and VP

He has hardly ever hit the ball.
He is certainly a mathematician
He will certainly be a mathematician.
He is almost always at school these days
He do be almost always at school these days (*)
He has almost always been at home.
He is not a mathematician.
He has never been a mathematician.
He did never be a mathematician (*)

It was on the basis of data of the types presented in 8 and 9 above that the Aux node was postulated in the first instance and placed directly under S, as a unit distinct from and unattached to the obligatory VP. If Aux is immediately dominated by S, it is argued that the analysis of certain phenomena, e.g., interrogative, negative, and compound sentences, is simply more elegant.[13]

Clearly certain facts are just as Williams describes them, viz., 'be' can be employed as an auxiliary and, as he claims, also as a full verb. But these tests indicate clearly that 'be' behaves like a model (which is the first lexical element of Aux in Williams' analysis) only in its simple finite forms, i.e., the present and past, but not in non-finite forms. In view of these facts, the analysis of the finite forms of the copula 'be' as a member of the Aux or model category seems compelling. But this is not to say that the postulation of two lexemes 'be' is the best technique to use in accounting for the distribution of the different forms of 'be'. Rather, the two-lexeme analysis seems to obscure the fact that the various morphological forms of 'be' (and other verbs) have a characteristic distribution. But each form has only one characteristic distribution, not two.

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[13]For details concerning these tests and others for auxiliaryhood, see, e.g., Quirk, Greenbaum, Leech and Svartvik 1972: 63-70; Palmer 1974; Akmajian and Wasow 1975; Pullum and Wilson 1977.

Williams makes interesting claims concerning the distribution of the two 'be's of his analysis. He gives examples to illustrate that 'be' Aux can occur in clausal constructions (such as tensed sentences, infinitives, gerunds, non-restrictive participles, nominative absolute constructions as in 10 below).

10 (a) John is dead.

(b) to be dead

(c) his being dead

(d) John, being dead

(e) John being dead

but not in non-clausal constructions (such as perception-verb complements, causative verb complements, perception verb stem complements, restrictive participles as in 11)

11 (a) I saw John being dead (*)

(i) I saw John being obnoxious.

(ii) I saw John dead.

(b) I made John dead (*)

(c) I saw John be dead (*)

(d) The man being dead is here (*)

Williams claims (although he does not demonstrate) that 'to be' and 'being' in the examples in 10 function as an Aux. In fact, there is evidence that they do not function as auxiliaries. The following questions and negative expressions are not well formed.

12 (a) To be John dead? (*)

(b) Being John dead? (*)

(c) Been John dead? (*)

13 (a) John to be not dead (*)

(b) John's being not dead (*)

(c) John, being not dead (*)

(d) John being not dead (*)

The sentence types in 11 containing various forms of 'be' and 'dead' will be discussed from a semantic viewpoint in 4 3

Following Ross (1969), Pullum and Wilson (1977), I will use the term 'auxiliary' to refer to a constituent of the category verb in a particular syntactic position In my analysis, this position is labelled INFL, a finite verb position In this perspective, *auxiliary* is basically a functional notion rather than a categorial one Like 'Subject' and 'Predicate' then, 'Aux' need not and ought not to be included in the structural representation of sentences in terms of phrase markers or labelled bracketing (See 1 2 1 for a discussion of the use of functional and categorial notions in this work) If *auxiliary* is indeed a functional notion, then we may simply say that unlike other verbs, finite 'be' has the capacity to function as an auxiliary The data so far suggest that we are dealing with idiosyncratic facts concerning 'be' The finite forms of 'be' share a distributional property with modals and 'do', which other full verbs lack Clearly it is necessary to account for the different distribution of various forms of 'be' in some way I will suggest in 2 2 2 that the INFL position is simply limited to finite verb forms that strictly subcategorize only for VP complements But I will argue that 'be' functions primarily as the head of VP Next, I will consider the analysis of the verb 'be' as a copula.

(ii) 'Be' categorized as a copula. What is the motivation for categorizing 'be' as a member of a separate syntactic category copula? Judgments about the adequacy of various linguistic descriptions of 'be' that are available in the literature must be made in the context of the specific theoretical assumptions underlying the proposals In the first place, I am more interested in reasons for analyzing 'be' as a full verb rather than as a member of a separate category copula However, a particular categorial and structural analysis may be affected by whether the linguist

purports to state universal or language-specific principles of syntax. If one is looking for principles of UG, then considering English 'be' in the light of certain other languages of the world, the data look different. Some languages have no verbal element that corresponds to copular 'be' in English, e.g., Maori, as described by Andy Pawley (personal communication)

10 (a) ko hōne te + nei tangata
foc John the here man
"This is John"

(b) he wahine pai tō + ku whāea
indef. woman good my mother
"My mother is a good woman"

Many other languages have similar "verbless" sentences, e.g., Samoan (Clark 1969) I claim that such verbless sentences are not unmarked in languages across the world. But languages which lack copulas do have obligatory verbs and VPs. Copula is not a category that is found universally across languages, while verb apparently is. (See, e.g., *Universals of language* ...1966 4). It is surely arguable therefore that the analysis of any sentence that does not postulate an obligatory VP cannot be correct. Even simple categorical sentences without copulas are only analyzable and interpretable, it seems to me, by contrast with sentences which have full lexical verbs These verbless sentences, I would argue, just contain an empty verb category. (For a language which lacks a copula that is equivalent to 'be' in English, it would not make much sense to posit an empty copula position. On the other hand, any natural language is expected to have verbs. The analysis of 'be' as a copula would seem more natural if most languages had copulas, or if some language had only copulas, but no verbs. I assume that no such languages exist.)

On the other hand, languages may possess more than one lexeme to express the same semantic relations that are conveyed by the one verb 'be' in English (Lyons 1968: 388; 1977: 471). Even English has more than one copula. The "current" copulas include 'appear', 'be' 'seem', etc., "resulting" copulas, 'become', 'get', 'turn', etc. (See Quirk, Greenbaum, Leech and Svartvik 1972 820-830 for a discussion of the various types of copulas and intensive complementation.) However,

none of the other copulas in English behave in exactly the same way that 'be' does Although the verbs 'be' and 'become' subcategorize for the same categories, unlike 'be', 'become' cannot function as an auxiliary or pro-VP, as indicated by the ungrammatical sentences below

11 (a) Mary was a teacher
Mary became a teacher

(b) Mary was wealthy
Mary became wealthy

(c) Mary was a teacher and Martha was ___ too
Mary became a teacher and Martha became ___ too (*)

(d) Mary was wealthy and Martha was ___ too
Mary became wealthy and Martha became ___ too (*)

(Or, as Williams would describe it, post-Aux XP Deletion does not operate after 'become') It appears then that copulas, other than 'be', behave similarly to other full verbs. Since 'be' can function as an auxiliary or as a full verb, as observed in the previous section, it does not behave exactly like other copulas in English Since it can function also as a full verb, 'be' does not behave exactly like other auxiliaries either Then why not simply analyze it as a verb?

It seems that 'be' may be analyzed in several different ways, depending on the kinds of syntactic generalizations the linguist wishes to capture Chomsky (1965), for example, is seemingly led to propose a separate category (copula) in order to exclude 'be' from the class of "transitive" verbs The analysis of 'be' as a verb is problematic since the behaviour of the VP it heads is exceptional with respect to certain syntactic processes For instance, sentences containing 'be', e g, 'This strawberry is mine', 'Ruth is a good teacher' do not passivize Chomsky (1965) explores the possibility of defining transitive verbs by the following properties: [+V, -N, +___NP] Analyzed as a copula, 'be' would have a different categorization and a more general subcategorization frame [+Copula, +___NP/AP/PP] [1] Nevertheless [Copula + Predicate complement] would occupy the same position in phrase markers as the VP headed by a transitive verb (Chomsky 1965 72) In this case,

[1] Like other linguists within the EST framework, Chomsky would analyze 'is' in the phrases 'is sleepy' and 'is sleeping' differently. The first would be categorized as a copula, and the second as Aux. The Aux precedes VP, while the copula is part of the VP

the categorization of 'be' as a copula is clearly not determined solely on the basis of distributional criteria but rather on its strict subcategorization frame. But I would argue that this aspect of the lexical item 'be' should not lead to a categorization other than V In fact, it seems to me that having a subcategorization frame is a feature that 'be' shares with other members of the verb category.

Fundamentally, the categorization of 'be' as a copula is perfectly correct and plausible. After all, 'be' is always and only a copula. Traditionally, 'copula' has been defined as "... a linking verb, i.e., a verb that has little independent MEANING, and whose main function is to relate other elements of CLAUSE structure, especially SUBJECT and COMPLEMENT " (Crystal 1980. 93) The notion of *copula* is often characterized in terms of its role in so-called "intensive" predication, resulting in monadic propositions usually involving a single reference class. For now, I wish to disregard completely the question of meaning. The corresponding structural characteristic of copular verbs is their obligatory complementation. It is important to notice that irrespective of its function, 'be' always takes an obligatory predicate complement. I assume that this is specified in the verb's strict subcategorization frame in the lexicon I shall argue that 'be' must always occur in the environment [+ ___ XP], where X is a major category, N, A, P or V This is illustrated in the following pairs of sentences, where 'is' functions both as auxiliary and as full verb, and 'being', only as a full verb. Both forms are copular

12 (a) John is a scholar.
John is being a scholar

(b) John is kind.
John is being kind.

(c) John is in one of his crazy moods.
John is being in one of his crazy moods.

(d) John is insulted.
John is being insulted.

(e) John is (*)
John is being (*)

Sentences containing 'be' in any form (finite or non-finite) without a complement are ungrammatical, as in 2 (e).[2] Thus, the analysis of 'be' as a single lexical item categorized as copula would capture an important syntactic generalization. That is, whether 'be' functions as an auxiliary or as a V, it has only one subcategorization frame: [+___XP]. As an auxiliary, 'be', like all other auxiliary verbs, must be followed by a phrase of the category V. (I shall consider this phenomenon in detail in 2.3.3.) Although the strict subcategorization frame of 'be' is more general than those of other copulas (which generally do not include VPs) and other verbs, 'be' does nevertheless take all and only the same categories of complements that some other verbs do. In terms of strict subcategorization, there seems to be no good reason for analyzing 'be' as a member of a category distinct from other verbs.

Now to summarize my observations about 'be' up to this point, I have called attention to the fact that for the grammatical analysis of 'be' (Aux or V), the linguist (or the speaker) has to consider only a single set of morphophonological forms, as observed by Palmer (1974: ch. 6). It is also possible to distinguish between the syntactic distributions of the different forms of 'be' the finite forms can function as an auxiliary or as a full V. The non-finite forms can only function as full verbs. 'Be' (finite or non-finite) is always copular. If the syntactic category of auxiliary verbs is taken simply as V, the categorization and subcategorization frames of the 'be' could reasonably be collapsed as [+V,-N,+___XP]. It is just as necessary, however, to justify this generalization as it would be to justify a more specific syntactic analysis of 'be' as two different lexical items.

2.2.2 One-lexeme analysis of 'be' as a full verb

In this section I shall argue (i) that 'be' is a full verb and (ii) that there is only one lexical item 'be' in the grammar of English. The basic mechanisms that I find essential for this analysis include X-bar syntax (Chomsky 1986), strict subcategorization, and the inherent properties of the individual verb forms of 'be'. The properties of the different morphological forms of 'be' correspond to those of other full verbs.

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[2] Expressions such as "I think, therefore I am," "God is," etc., are proverbial and occur only in certain sublanguages of modern English, e.g., of philosophers. Such constructions are not productive in ordinary English. Existential statements will be considered further in Chapter 4.

For elementary sentences containing 'be', this is the syntactic analysis that I will support in this work. The labelled bracketing in 1 represents the structure of elementary sentences that I assume.

1 (a) D-Structure $[_{I''}$ NP$[_{I'}$ INFL$[_{VP}$ be XP$]]]$

(b) S-Structure $[_{I''}$ NP $[_{I'}[_{INFL}$ be$]$ $[_{VP}$ t XP$]$ $]]$

1 (a) represents the D-structure of all sentences containing the verb 'be'. Just in case 'be' is [+finite], then it must occupy the S-structure position labelled INFL, as illustrated in 1 (b), from which it governs the trace of 'be' (t) and the whole VP headed by t.

The constituents that function as the subject and the predicate of a simple sentence as traditionally described are NP and VP respectively. Within X-bar syntax, these phrases also function respectively as the specifier and complement of INFL, which is taken to be the head of the sentence unit. The NP (subject and specifier) is immediately dominated by I'', while the VP (predicate and complement of INFL) is immediately dominated by I'.

'Be' is analyzed here as a verb. In elementary sentences it functions as the head of the VP predicate phrase. My analysis is consistent with the traditional assumption that the verb is an indispensable element of sentences in English. I assume that the verb is indispensable since it is the head of the VP which is the obligatory complement of INFL. In many different systems of syntactic analysis, as observed by Lyons (1977: 435), ".. the verb is taken to be the pivot upon which all other constituents of the sentence ... depend and by which they are determined." Certainly I would ascribe to the verb a certain priority in determining the semantic character of a sentence. The rule of semantic interpretation that I propose in Chapter 3 for elementary sentences containing 'be' is stated in terms of the verb. I would consider this to be my strongest argument for a one-lexeme analysis of 'be'. But in this section I wish to consider only morphosyntactic data in support of the analysis of 'be' as a verb in the grammar of English. For syntactic analysis, I will argue that 'be' merits the same priority that is usually given to other verbs. That is, 'be' functions as the head of the VP (predicate phrase) and its subcategorization frame determines the other constituents of the VP. Within X-bar syntax, if 'be'

were not the head of VP, it is not clear how the phrase containing it and its complement would be generated.

In arguing for a one-lexeme analysis of 'be' as a verb in English, I will appeal to certain other assumptions and observations concerning 'be'. Here I assume the following supplementary hypotheses.

(a) Models and auxiliary verbs ('can', 'may', 'will', 'must', 'have', 'be' 'do', etc.) are categorized as verbs in English. They all take VPs as complements, as argued by Pullum and Wilson (1977).[3]

(b) The categorization and strict subcategorization of 'be' are represented as follows: [+V,-N,+___XP]

(c) 'Be' has only a single set of morphophonological forms, as observed by Palmer (1974: ch 6) They are all "listed" paradigmatically under 'be' in the lexicon, as suggested by Halle (1973, cf. Walsh 1985)

(d) The different forms of the lexeme 'be' have different syntactic distributions, which correspond to those of other verbs. Their behaviour corresponds exactly, with one exception. The finite forms of 'be', unlike other verbs, can function both as an auxiliary and as a full verb.

(e) 'Be' is base generated as a full verb which functions as the head of a VP.

(f) An inherent property of INFL (in English) is [+finite]. The INFL position may be empty, and it may be occupied only by a finite verb. If INFL is empty, the head of its obligatory VP complement is finite. For certain grammatical processes such as "Subject-Aux inversion," INFL cannot be empty.

(g) The finite forms of 'be' that function as the head of VP may move into INFL when required, "Head Movement" being constrained as described by Travis (1984: 130-145) in her analysis of German.

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[3]This analysis contrasts with that of Ross (1969) who treats auxiliary verbs as higher verbs in deep structure. There he analyzes successive verbs in a series as embedded complement clauses dominated by NP.

The main thesis that I wish to support is that 'be' is a single lexeme and that the categorization that is most suitable is V.

(1) 'Be' is a verb. It is not easy to find tests for "verbhood" which do not beg the question or which do not somehow depend upon the assumptions of the very hypothesis that one is trying to support. Probably the best strategy would be to find another lexical element whose status as a V is uncontroversial and to demonstrate that 'be' behaves distributionally in the same way. Consider the verb 'see', for example. Although the distribution of 'see' is not as general as that of the copula 'be', both 'see' and 'be' do fit into some of the same sentence frames. They both have in common at least the following subcategorization frame: [+___NP], although 'be' may also occur in other contexts. The context [finite verb ___ NP] reveals two distributional similarities shared by 'be' and 'see'. It appears that both lexical items are modifiable by the same tenses, aspects and modalities. Both 'see' and 'be' fit grammatically into the same sentence frames following a modal or another auxiliary. The main point to notice is that not all forms of either lexical item may be grammatically substituted in this context. The form that is required in the position underlined in the sentences in 1 is the base form. In the case of the verbs 'be' and 'see' this fact is easy to discern since they both have different forms for the base, simple finite, and participles.

2 (a) John shouldn't see the teacher.
John shouldn't sees the teacher (*)

John shouldn't be the teacher.
John shouldn't is the teacher (*)

(b) John could see the teacher.
John could saw the teacher (*)

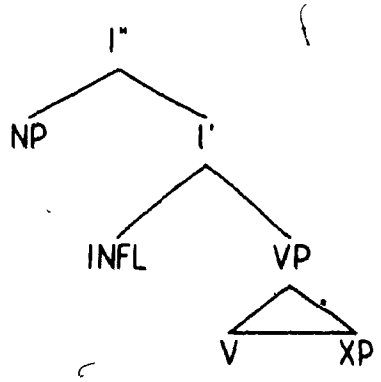
John could be the teacher.
John could been the teacher (*)

(c) John will see the teacher.
John will seeing the teacher (*)

John will be the teacher.
John will being the teacher (*)

The evidence presented here indicates overwhelmingly (according to the paradigmatic substitution test) that 'see' and 'be' belong to the same syntactic category. Let us assume for the sake of argument that 'see' is a verb. If so, then so is 'be'. Assuming that auxiliaries are finite verbs, I take it that the grammatical sentences in 2 above indicate that an elementary sentence has two verb positions. Clearly only one of the verb positions is finite, as indicated by the ungrammatical sentences in 2 (a). That is, a single elementary sentence can have only one finite verb. I will postulate that the auxiliary verb occupies the finite INFL position and that the base verb 'be' or 'see' would function as the head of the VP complement in the following structure.

3



But there is another position that can be occupied by a finite verb. This is the same position of 'be' and 'see' in 2, the position of the head of VP, the obligatory complement of INFL. I would argue that this is in fact the only context in which finite forms of both 'see' and 'be' may both occur. In English, the following string is neither grammatical nor meaningful.

4 John ____the teacher (*)

Now the finite forms of either 'see' or 'be' (as well as the corresponding forms of other verbs in English) may be inserted into this context to obtain 5 (a) or (b), both of which are grammatical and meaningful.

5 (a) John saw the teacher.

5 (b) John was the teacher.

The important thing to notice about the verbs in 5 is that both are in a position which requires tense, or more precisely, a finite verbal element. Both 'saw' and 'was' display morphological tense, person and number, voice, mood. If 'saw' and 'was' occupy the same position, then they must both function as the head of VP, since 'saw', unlike 'was', never functions as an auxiliary, as in question formation.

6 (a) Was John the teacher?

(b) Saw John the teacher? (*)
Did John see the teacher?

For "Subject-Aux inversion" INFL must contain a finite verb. The position may be filled by a modal or 'have', but if it is empty, 'do' is used for questions, except for questions containing a finite form of the verb 'be' This is an idiosyncratic fact concerning 'do' as much as 'be' For interrogative sentences that correspond to declarative ones containing a finite form of 'be', it is finite 'be' that moves into INFL (which must be empty). This movement leaves the head position of VP empty, but it meets the constraints on movement by heads proposed by Travis (1984: 145). "Heads can move only if they move into the category by which they are governed." Furthermore, they can remain empty only if properly governed. What is exceptional about 'be' is that it must function as an auxiliary under these conditions. Of course, if INFL were not empty, that is, if it contained another finite verb (which could only be a modal, 'do', 'have' or 'be'), then 'be' would not be finite in the VP in the first place.

It seems reasonable to assume that finite 'be' is base generated as the head of the VP (predicate phrase), which is linked by the INFL projection to the subject NP to form the sentence unit Lexically, the head of VP is the element which determines the choice of the other elements in the VP. The verb 'be' determines the possible categories of its complement, whether NP, AP, PP, or VP. It may occur grammatically only in these contexts. In fact, I assume that each element in the auxiliary-verb system of English determines the categories of its complement. (The syntax of the complements of 'be' is the subject of 2.3.) 'Be' is not exceptional in this respect. Thus finite 'be' first occupies the D-structure position of head of the obligatory VP that is dominated by INFL. In S-structure it is required

in INFL for question formation and negative placement, e.g Any finite form of 'be' then moves into the empty INFL position, from which it governs the VP, including its own trace.

(ii) There is only one lexical item 'be'. In arguing for a one-lexeme analysis of 'be', I shall now consider other diagnostic criteria for determining constituency (Radford 1981: 69) The data that I shall consider next involve deletion and coordination Rather than to refute the claim that there is more than one lexical item 'be', in this section I shall question the necessity to posit more than one If there is only one lexical item 'be', then presumably it would belong to only one major lexical category. If so, I assume that it would be categorized as a verb

The first syntactic evidence that I shall consider involves one of the few grammatical processes that may be restricted to the category V That is, gapping (ellipsis or deletion of a repeated verb in compound sentences) is said to involve only members of the category V. As I shall demonstrate here, the "gap" that is left in the reduced clause may be filled by either 'see' or 'be' In other words, both auxiliaries and verbs, as Williams would analyze them, may be deleted in the same context

7 (a) John saw the teacher and Bill ___ the tutor.

(b) John was the teacher and Bill ___ the tutor.

Assuming that the rule of gapping applies to constituents that belong to a single category, one could argue that if 'see' belongs to the category V, then so does 'be'. The verb 'be' may also be deleted when it is followed by complements of syntactic categories other than NP, as illustrated here

8 (a) Fanny is happy and Jane ___ miserable

(b) Peter is a born winner and Bill ___ a born loser

(c) Jean is in Paris and Juan ___ in Madrid.

(d) Bill was killed and Art ___ critically wounded.

In sentences with compound VPs, 'be' functions as the head of a VP that may be conjoined with a VP headed by other verbs such as 'have', 'get', etc.

9 (a) Bain must [$_{VP}$be sick] or [$_{VP}$have one of his headaches]

(b) Phillis will [$_{VP}$be in charge] or [$_{VP}$get someone else]

(c) Kenneth has [$_{VP}$ been the chairman] and [$_{VP}$received a raise]

Next, we will see that phrases containing finite 'be' can be coordinated idiomatically with other similar strings containing verbs such as 'walk', 'talk', 'seem', 'appear', 'act' These verbs may take the same complements that 'be takes naturally First, the simple sentences (10), then those with co-ordinated VPs (11)

10 (a) J R walks like a real Texan

(b) J R talks like a real Texan

(c) J R acts like a real Texan

(d) J R appears like a real Texan

(e) J R seems like a real Texan

(f) J R is like a real Texan in every respect

11 (a) J R [$_{VP}$walks like a real Texan] and [$_{VP}$talks like one] too

(b) J R is a real Texan and acts like one, too

(c) J R seems like a Texan and is one, too

(d) J R is a Texan and walks like one, too

(e) J R is very much like a real Texan and talks like one, too

Assuming that 'is' occupies the INFL position, then it is clearly possible to combine both VPs and INFL phrases under similar discourse conditions I take this as evidence that so-called "auxiliary verbs' share some characteristics with full verbs, or that the distinction is at least partly artificial If INFL is analyzed as a finite V position, then the syntactic category must include both auxiliaries and verbs

The arguments presented above are directed toward the defence of the analysis of auxiliaries, including the finite forms of 'be', as full verbs rather than as members of a separate category Now I will finally present some data as evidence that there are not two separate lexical items 'be' These are

further examples of co-ordinated sentences containing 'be' which include forms that have been analyzed traditionally as both auxiliaries and full verbs Since both can appear together in the same sentence which one is actually represented is sometimes thought to be open to question The first example from Wasow appears in Falk (1984 499)

12 (a) Pat is a liberal Democrat, ___ running for mayor, and ___ expected to win

(b) John is in the garden and ___ working hard

(c) Philip was sick, ___ in the hospital, and ___ released again

To determine whether 'be' functions exclusively as an auxiliary or as a full verb (that is, whether it is immediately dominated by I' or by V'), one could employ the same tests as before It seems that in all cases 'is' or 'was' occurs in the surface INFL position The following examples provide evidence for this claim In all cases, the finite forms of 'be' are involved in "Subject-Aux" inversion

13 (a) Is Pat a liberal Democrat, ___ running for mayor, and ___ expected to win?

(b) Is John in the garden, and ___ working hard?

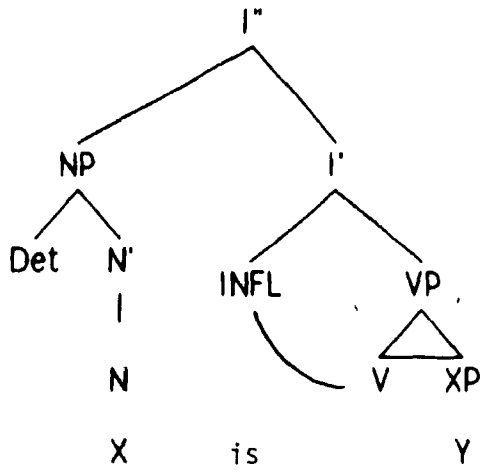
(c) Was Philip sick, ___ in the hospital, and ___ released again?

These questions are all interpreted as requesting yes or no responses to all clausal components That is, 13 (a) asks whether Pat is a liberal Democrat, whether he is running for mayor, and whether he is expected to win Therefore, the 'is' must be analyzed as dominated by I' We may conclude that any finite form of 'be' then must appear in the INFL position in surface structure Maintaining the claim that both auxiliaries and verbs belong to the general class [+V, -N], I shall return to the analysis of 'be' as a verb in 2 3 3, which concerns the VP complements of 'be'

2.3 Syntactic analysis of the subject and predicate terms

In this section I continue to examine the internal structure of the grammatical subject and predicate phrases of simple categorical sentences in English. In particular, I will concentrate here on the syntax of the elements that are analyzed in traditional formal logic (TFL) as the subject and predicate terms, represented by the terminal variables X and Y in the following phrase marker

1



As described in 1.2.1, there is an asymmetry between subject and predicate terms. While an NP as a whole is said to function as the subject of the sentence (not just as the subject term), in the VP a whole phrase XP functions as the predicate term. XP is the maximal projection of X, which may be any major category. The predicate term may thus correspond to one of the following phrasal categories: NP, AP, PP or VP, but not Adverb P. This structural description applies to the following elementary sentences. The terms that substitute for X and Y are underlined below and the phrasal category of the predicate term is indicated in parentheses.

2 (a) These are strawberries. (NP)

(b) Tom is a barber. (NP)

(c) The volcano is active. (AP)

(d) I am in the garden. (PP)

(e) I am here. (PP)

(f) A boy was running. (VP)

(g) His present is being wrapped. (VP)

(h) She is sadly (Adverb P) (*)

(i) He is carefully (*)

(j) I am truly (*)[4]

All of these sentences (grammatical and ungrammatical) have one lexeme in common. Each one contains a finite form of the verb 'be' The main grammatical function of 'be' in categorical sentences is to link the subject and the predicate, according to traditional thinking. Actually, if my analysis of 'be' as a verb is correct, then it is the function of INFL to link the subject and predicate phrases The syntax of 'be' is the subject of section 2.2, in this section, I will focus on the terms themselves Here I will look at the syntactic categories that correspond to these terms and consider each syntactic category with respect to the claim about the interchangeability of the subject term and the predicate term of a proposition (Sommers 1982, 17). Just to recapitulate, a basic problem is that for the following functional structure, as discussed in 1.2.1,

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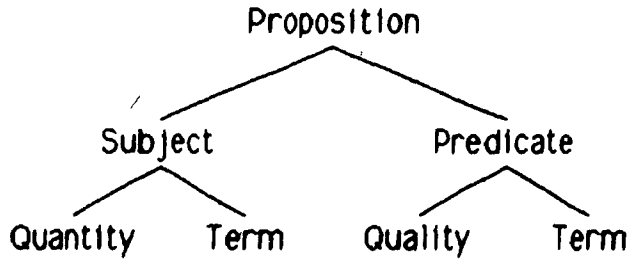

the terms do not always correspond to the same syntactic categories. Thus, for linguistic analysis of sentences of ordinary language, it is difficult to know what to make of any general claims concerning the syntactic distribution of the terms. In order to make the discussion more precise, I will analyze the terms categorially, according to the syntactic categories that may actually appear in the surface structures of elementary sentences in English. In particular, I will now briefly consider terms that belong to the syntactic categories N or NP (2.3.1), AP and PP (2.3.2) and VP (2.3.3). It is possible

[4]But, from philosopher Jan Crosthwaite: 'What God decrees will be necessarily'. For my explanation, see note 2 above.

the purely syntactic property of convertibility holds only for terms belonging to certain categories, but not others It appears to be possible only in the case of NPs that function as predicate terms

2.3.1 Subject NPs and NPs that function as predicate terms

The subject of a proposition corresponds to the phrasal category NP. Moreover, only NPs may function as the grammatical subjects of elementary sentences in English.[1] Within TFL, the obligatory elements of the logical subject of a proposition are "a sign of quantity" and a "term." (Sommers 1982. 17) Here I will concentrate on the syntactic categories that correspond to the terms rather than on the sign of quantity[2]

The primary thesis that I wish to propose and defend concerning possible subject and predicate NPs is that syntactically their structures may be identical From a syntactic point of view, all NPs may be identical both in internal structure (constituency) and in (external) distribution (Williams

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[1]The same observation holds for compound sentences in English. Subjects that seem to provide counterevidence to this generalization all contain morphosyntactic elements (affixes, particles, or function words) that could be analyzed as signs of nominalization. Examples of possible nominalization signs are underlined in the following sentences.

(a) [Seeing] is believing.
(b) [Getting started] is the hardest part.
(c) [To refuse] would be impolite.
(d) [The rich] are not always content.
(e) [That Mai is a student of English] is news to me.

Sentences containing complex NPs (e.g., those with relative clauses) or embedded sentences (e g , (e)) are outside the scope of this work, which treats only elementary sentences.

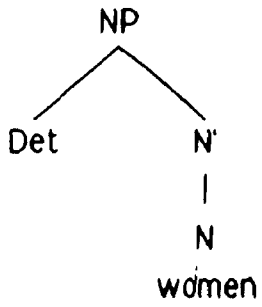
[2]In this dissertation, I will use the term 'determiner' to refer to the syntactic category that includes "signs of quantity," but I will not focus on the analysis of determiners Rather, I will assume the analysis of quantification proposed by Bellert (in 1985, and in works in progress), which provides a detailed semantic description of linguistic quantifiers. They are distinguished by lexical features [absolute] and [distributive]. She proposes rules which refer to these features to determine the co-occurrence of individual quantifiers in sentences of natural language. On the basis of these lexical features, quantifiers may be interpreted in their natural (surface) syntactic positions, without the necessity of grammatical movement. Another analysis of quantification that has a similar effect is proposed by Barwise and Cooper (1981). They claim that "quantifiers correspond to NPs, not to determiners." (1981: 61). In contrast, Bellert analyzes every "NP-argument" as a quantified term, i.e., a linguistic quantifier and a term (a set expression with a denotation and a reference class). (For details, see the works by Barwise and Cooper and by Bellert.)

1983. 432 also makes a similar claim.) Thus, for sentences of the form [NP be NP], the constituency of both NPs may be accounted for by the same structural analysis.

1 (a) $[_{NP}$ Det $[_{N'}$ N (PP) (I")]]

By convention, the syntactic categories enclosed in parentheses are considered optional. In the analysis in 1 above, the syntactic category determiner (Det) is not enclosed in parentheses since *optionality* does not seem an appropriate notion to use in describing the occurrence of determiners in NPs of English In the case of common nouns, it seems that when an article can occur, it must occur NPs thus formed must always contain at least two levels of structure in addition to the lexical head N. In TFL, the determiner and N' phrase would be analyzable as the "sign of quantity" and the "term", respectively. In my analysis according to the following X-bar schema,[3] the determiner functions as the specifier of N, but Ns generally do not have obligatory complements Although Det is an obligatory category, it may be superficially empty

1 (b)



Not only does this structure represent the essential structure of NPs in English, but also it reflects some of the general characteristics of nouns and NPs in English. As for the internal structure, common nouns are generally preceded by articles, quantifiers and/or other determiners. But some common nouns may occur without determiners, e.g., the so-called "mass" or non-countable nouns,

[3]For the constituents to be analyzed as terms, I notice the order of elements in phrase structures and dominance relations rather than the exact number of intermediate bar levels contained in the projection of a particular lexical category. Besides, some of the data presented in support of different levels of structure for NPs seem to be questionable (*cf.*, e.g., Radford 1981: 91-112). Thus, the configurational patterns of phrases are often illustrated here with only two levels of structure, lexical categories and maximal projections.

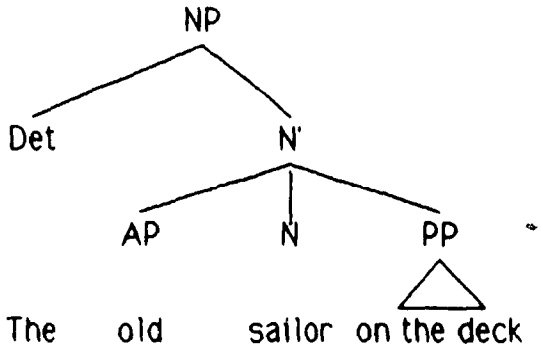
common nouns used generically in the plural. (Plurality is most often indicated by an '-s' suffix added to the head noun.) On the other hand, proper nouns and pronominals do not occur with articles, quantifiers or other explicit determiners, as a rule. When a determiner does appear, it must be contextually consistent with certain features of the noun which follows in the NP For example, an important morphosyntactic feature of all nouns, in addition to Case, is number Nouns in English are inherently either singular or plural. This applies to all nouns, whether they occur with or without explicit determiners or quantifiers. For certain lexical items, quantity and term are unanalyzable, i.e., as two or more separate lexical items. For example, distributionally, a noun and its modifiers may be replaced by a pronominal or by a proper name. The pronominal and proper name must then be syntactically (and co-referentially) equivalent to the entire NP. This idea comes from Sommers (1982) who says that pronominals and proper names contain an implicit sign of quantity. The syntactic employment of pronominals and proper names is not however entirely parallel. While proper names occur frequently with determiners and adjective modifiers, e.g., 'my dear John', 'poor King Lear', 'old Mr. Seuss', etc., this seems impossible for pronominals, e.g., 'my dear he' (*), 'poor she' (*), 'the only it' (*), etc. Thus, it might seem appropriate to analyze pronominals lexically as NPs, but to consider proper names as bare Ns. Within X-bar syntax it is presumably not necessary to make this distinction in the lexicon, as every N theoretically projects maximally as NP. In general, it seems that nouns which do not contain an implicit sign of quantity must be accompanied by an explicit one, such as an article, possessive pronoun, or other determiners. As a first approximation, the structure in 1 (b) would seem adequate for the analysis of NPs in English.

There are other important distributional characteristics of nouns that are reflected in the structural analysis represented in 1 (a). In addition to the obligatory determiner, common nouns may be modified optionally by pre-N APs. Common nouns as well as proper nouns may be followed by PPs which function as post-modifiers or by Ss which function as clausal complements, such as relative clauses. In general, only one determiner of a kind[4] but more than one adjective may precede the noun. But the number of PPs and relative clauses that may follow it is apparently unlimited, at least in

[4]For details, see Quirk, Greenbaum, Leech and Svartvik (1972: ch. 4. 13-27).

theory. The kind of syntactic relations that hold between the obligatory elements of the NP and the optional elements that may possibly occur within NP is precedence rather than dominance. The optional constituents follow the essential ones: optional APs follow the Det and precede the head N, while optional PP and I" complements follow the head N, as illustrated in the following structures.

1 (c)



This description of the NP in English is highly simplified. For some idea of its complexities, see, e.g., Quirk, Greenbaum, Leech and Svartvik (1972. ch. 4). For now, consider the following sentences illustrating fuller examples of the NP. The NP subjects are bracketed in 2 - 4 below

2 (a) [Half (of) my first new salary check (which I) received yesterday] is sufficient.

(b) [It] is sufficient

3 (a) [All (of) the last three bottles of Harvey's unsweetened mango juice (that) we bought at the dairy] were bitter.

(b) [The unsweetened mango juice that we bought at the dairy] was bitter.

(c) [They] were bitter.

(d) [It] was bitter.[5]

4 (a) [The author of "Hamlet"] was on the stage.

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[5] 'They' is 3 (c) is used to refer to the bottles of mango juice mentioned in 3 (a) and 'it' in 3 (d) is used to refer to the juice mentioned in (b). Presumably subject-verb agreement holds between the heads of the subject NP and the predicate VP. If so, then in sentences 2 (a) and 3 (a), the quantifiers must be the heads of the subject NPs respectively. In 2 (a), even if the noun 'cheque' were plural, the verb would still agree in number with 'half'. Agreement holds between the NP and the verb, regardless of the semantic content of the noun, i.e., whether it designates a number, quantity, or an individual.

(b) [Shakespeare] was on the stage.

(c) [He] was there.

Although I will not elaborate the rules for interpreting NPs containing pre- or post-modifiers (long strings of APs or PPs or even relative clauses) as in 2 (a) and 3 (a)-(b) above, for the purpose of demonstration, I have illustrated some possible NP constructions. Linguists have written extensively about the integrity of the NP as a whole. One of the most thorough treatments of the complex NP within generative grammar is that of Ross (1967), which treats the NP as an "island." He demonstrates that movement affects the entire NP. It is replaceable by a pronominal or by a proper name, as illustrated in 2 - 4

In supporting my claim that the potential structure of NPs is the same in both subject and predicate positions, I will focus briefly on the role of the determiner in NPs. Intuitively, I would argue that if determiners in the subject NP are analyzable as "signs of quantity," then those in the predicate NP must also be analyzed as signs of quantity. Certainly they would be members of the same category or subcategory, Det, which would function as the specifier of N. In syntactic analysis, NPs must be considered independently of the contributions they may make in the "referring" function of the subject or in the "characterizing" function of the predicate. Here it is simply a question of the syntactic constituency or well-formedness of NPs in English. In English sentences of the form [NP is NP], the two NPs must agree in number. That is, when the subject noun is plural, the predicate noun must also be plural, as observed by Bach (1968: 103).

5 (a) These are two of my best friends.

(b) These are a best friend (*)

(c) Tom is my best friends (*)

6 (a) Rocky is a golden retriever.

(b) Rocky is some golden retrievers (*)

(c) These dogs are a golden retriever (*)

7 (a) Jane Austen is one of my favourite novelists.

(b) Jane Austen is two of my favourite novelists (*)

(c) Jane Austen and Gore Vidal are my favourite novelist (*)

Clearly, the subject and predicate must agree in number (or quantity). Now if articles and other determiners are interpreted as "signs of quantity" in the subject NP, then how could they fail to be interpreted as signs of quantity in the predicate NP? It seems beyond dispute that in English both subject and predicate NPs, or rather NPs in general, must contain a sign of quantity, whether they occur in the subject or in the predicate NP positions. This is merely a special part of the general claim that I wish to defend here.

The general claim that I wish to illustrate next is that wherever an NP can occur, in particular in the subject or in the predicate NP positions, the same syntactic structure is possible, according to X-bar syntax. This claim, which is more vague, is consistent with the fact that all NPs have potentially the same (external) distribution I will now illustrate this point with sentences containing simple and complex NPs, proper names and pronominals.

8 (a) A book that I mentioned to you is this (one).
This is a book that I mentioned to you.

(b) The book that I mentioned to you is this (one)
This is the book that I mentioned to you.

(c) This is a strong perfume.
A strong perfume is this.

(d) She is the one wearing red.
The one wearing red is she/her.

(e) Mrs. Farthing is the person approaching.
The person approaching is Mrs. Farthing.

(f) This is France.
France is this (country).

(g) Paris is the capital of France.
The capital of France is Paris.

(h)The place for me is here.
Here is the place for me.

Within the limitations of the analysis in 1 (a), there seem to be no absolute syntactic restrictions on the types of categorial elements that can occur in NPs, either in the subject or in the predicate position, as attested by the sentences in 8.

There have been attempts in linguistics to account for the occurrence of definite or indefinite NPs in subject and predicate positions. Bach (1968: 103), for example, suggests that there are "restrictions on the kinds of determiners allowed." In the following examples, the (a) sentences are acceptable, but not all of the (b) ones.

9 (a) Don is a teacher.

(b) A teacher is Don (?)

10 (a) Every chairperson is a professor

(b) A professor is every chairperson (?)

11 (a) Each thief is a coward.

(b) A coward is each thief (?)

12 (a) A whale is a mammal.

(b) A mammal is a whale (?)

13 (a) Whales are mammals.

(b) Mammals are whales (?)

14 (a) Seeing is believing.

(b) Believing is seeing (?)

15 (a) Tom was the/a student who could answer the question.

(b) The/a student who could answer the question was Tom.

It may be true that the acceptability of the sentences above is indeed related to the distribution of determiners, as Bach (1968) suggests. Assuming various distribution classes or subclasses of determiners, however, the problem is probably not limited to the kinds of determiners that are combined in elementary sentences. For example, the determiners are the same in 12 (a) and (b) and there are no explicit determiners in 13 and 14. It is not clear that this phenomenon even has a purely

syntactic explanation. For instance, surely the problems in sentences 12-14 can be correlated with ontological incorrectness, which seems more relevant to semantics than to syntax, as does the particular-general concept distinction made in MPL.[6] (See 1.2.1 and 1.2.2 for a discussion of these phenomena.) I shall consider the semantic relations corresponding to such subject-predicate sentences in Chapter 3. As for syntactic explanation, it is plainly not a matter that can be settled by stating absolute syntactic conditions, but only relative ones, perhaps like agreement between the two NPs linked in predication, as in 5 - 7 above.

NPs are characterized here as maximal projections of their head Ns. Accordingly, it does seem that the best syntactic description of NPs is in terms of a strict categorial analysis. No absolute distributional distinction and no absolute structural distinction can be made between NPs that can function as subjects of elementary sentences and those that can function as predicate terms. Assigning some heads to a category of subject nouns and others to a category of predicate nouns would clearly make for a rather inefficient syntactic description. I would argue that essentially the same nouns can function either as subject terms or as predicate terms. As Chomsky has argued (1965: ch. 2), 'subject' and 'predicate' are relational or functional notions and should not be confused with categorial notions. Only categorial notions seem suitable for capturing syntactic generalizations within a linguistic competence grammar. (For further discussion, see 1.2.1.)

2.3.2 APs and PPs that function as predicate terms

Categorical sentences whose predicate terms are not analyzable as NPs, e.g., where X is an A, a P, or a V, do not permit the grammatical interchange of subject and predicate terms. Or they seem to be less freely interchangeable syntactically in sentences that are grammatically acceptable. Here it is necessary to be clear about Sommers' claim that the subject terms and the predicate terms of

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[6] Jackendoff (1983) would probably account for the questionable sentences by saying that the (b) sentences illustrate the pattern [TYPE]-BE-[TOKEN], which is not possible. I claim that my analysis of elementary sentences containing 'be' will provide a basis for explaining the difficulty. I would analyze 'be' in terms of the notion of *belonging* to a type. For true statements, the referent of the subject must belong to the type(s) denoted by predicate term. Thus the (b) sentences all seem unnatural, because the extension of the subject is more inclusive than that of the predicate term.

propositions are interchangeable syntactically. It differs from what I implied by my examples in 2.3.1, as I shall now demonstrate. I will cite one of Sommers' examples.

1 (a) Some Spaniards are philosophers.

(b) Some philosophers are Spaniards.

Sommers (1982: 300) says that the predication in 1 (a) is natural in both directions. By this, he means that either N, 'Spaniards' or 'philosophers', can function as the term of the natural subject. Notice that the determiner is the same in the NPs that function as subjects for the two sentences in 1. What Sommers does not mean is the mere switching of the syntactic positions of the NPs that function as the subject and the predicate term, as in the following sentences. To be perfectly clear, I will illustrate this point with sentences containing AP and PP predicate terms. The data presented in 2-4 involve subject-verb agreement and APs and PPs that shift positions with NPs that function as the subjects of the sentences. In the (e) sentences there is a violation of subject-verb agreement.

2 (a) A man is at the door.

(b) At the door is a man.

(c) Some men are at the door.

(d) At the door are some men.

(e) At the door is some men (*)

3 (a) John is without a job.

(b) Without a job is John.

(c) John and Paul are without a job.

(d) Without a job are John and Paul.

(e) Without a job is John and Paul (*)

4 (a) A man who understands this is wise.

(b) Wise is a man who understands this.

4 (c) A man who understands this is wise and happy.

(d) Wise and happy is a man who understands this.

(e) Wise and happy are a man who understands this (*)

From these sentences, it should be clear that it is the NP which maintains the function of subject even when it follows the verb. Here is a case where the notion of *subject* cannot be defined in terms of surface configurations. The explanation is, I believe, obvious. Syntactically, it is clearly the case that only an NP can function as the subject of the sentence in English. In sentences of English, there must always be agreement in number between the NP that functions as the subject and the verb. Number is an essential feature of constituents involved in subject-verb agreement But this is not a feature of the head constituents of APs and PPs, as the following analysis shows.

5 $[_{AP}$ (Adverb P) A (PP)]

6 $[_{pp}$ (Adverb P) P NP]

In contrast to NPs, both APs and PPs are modifiable by Adverb Ps rather than by adjective phrases. The head of neither is preceded by a sign of quantity (Det). Lacking determiners and a number feature, APs and PPs cannot function as the subject of sentences, although a phrase of either category may be embedded in NPs which themselves function as subjects. Thus there is a formal syntactic explanation for the failure of interchangeability between subject NPs and predicate APs and PPs. All subjects in English must be analyzable as a "sign of quantity" and a "term," as required by the TFL analysis according to Sommers. Next I will examine the syntax of VPs that function as predicate terms. The property of convertibility with the subject NP, as expected, does not hold for this phrasal category either, since the VP predicate complement is not inflected for number either.

2.3.3 VPs that function as predicate terms

My objective in this section is to provide a syntactic analysis of categorical sentences containing VPs that function as the complements of 'be'.

My thesis that there is only one lexeme 'be' depends crucially on the analysis of its VP complements as *terms*, in the sense of TFL. The only way that VPs can be taken to function as predicate terms in categorical sentences is to analyze 'be' in any form as a copula linking the subject NP and the VP predicate terms. It is precisely when its complement is a VP that 'be' is usually considered to function not as a copula, but as an auxiliary verb. I claim, however, that the subject-predicate relations of all sentences containing 'be', irrespective of its form, are semantically parallel. Thus, for the following sentences, the VP complements of 'be' in 1 (d)-(f) would be analyzed as terms, just the same as the NP, AP, and PP complements in 1 (a)-(c). The verb 'be' is underlined here and its predicate complements are bracketed.

1 (a) That <u>was</u> [$_{NP}$her idea]

(b) Sally <u>is</u> [$_{AP}$silly]

(c) Someone has <u>been</u> [$_{PP}$in this room]

(d) Dan <u>is</u> [$_{VP}$singing]

(e) Our house has finally <u>been</u> [$_{VP}$built]

(f) You <u>are</u> [$_{VP}$<u>to be</u> a medical doctor]

Thus, the progressive, passive, and predictive VP complements of 'be' in sentences 1 (d), (e) and (f), respectively, would also be analyzed as terms. Example 1 (f) illustrates a complication for this analysis of 'be'. The verb 'be' may function as the head of its own VP complement. Sentence 1 (f) simply contains two different forms of 'be', both of which are copular. This analysis is consistent with the observation that 'be' always takes a predicate complement, as required by its strict subcategorization frame. (It presents no problem for the semantic analysis proposed in this work.) First, I will review the morphosyntactic facts within the context of my hypothesis.

Unlike modals and other auxiliaries, 'be' may, but it does not have to take a complement of the category VP. There are constructions, however, in which 'be' is an obligatory element, namely the passive and the progressive constructions, as illustrated in 1 (d) and (e) above. 'Be' in any form may be followed by the progressive form of any full verb (i.e., verbs having a progressive form, including

'be' itself.[7] See sentence 2 (a) below.) The base form of 'be' and the infinitive 'to be' are used after modals and after 'am', 'is', and other finite forms of 'be', respectively (See sentences 2 (b) and (c) below.) Any form of the verb 'be' is used in the passive construction, followed by the past participle of another verb. 'Been' may occur in the passive construction, though it seems strange as a passive predicate complement itself since every form of 'be', including 'been', must have a complement. (See 2 (d) and (e) below.) While any form of the lexeme 'be' may take a VP complement, the head of the complement must be in a non-finite form.

2 (a) John is being obnoxious.

(b) Max may be the president.

(c) He was to be the president.

(d) The present has been wrapped.

(e) The concert has been been (?)

The possible verb complements of 'be' include the following non-finite forms: the '-ing' participle (progressive or non-finite) as in 2 (a), the base 'be' as in 2 (b), the infinitive as in 2 (c), or, for sentences in the passive voice, the '-ed' ('-en') participle as in 2 (d) above. In two of the sentences, (a) and (c), I have illustrated that the verb 'be' itself may function as the head of the VP complement of 'be'. Only in the passive sentence frame is a 'be' VP complement generally not used, but this is not because 'be' lacks the constituents that form the so-called "passive" construction. I have argued above (2.2) that the most efficient analysis of 'be' would provide a unified account of its syntactic employment as either a full V or an auxiliary. In this dissertation, 'be' as well as other lexical items analyzed traditionally as modals or auxiliaries will be treated as members of the syntactic category V. The primary distinction between the subclasses of verbs can be stated in terms of their subcategorization frames; auxiliaries subcategorize for VPs, unlike most other verbs. Any verb may occur grammatically in any verb position that fits its strict subcategorization frame. I have

[7] This fact is used by Williams (1984) as evidence that there are two lexical items 'be' in English. (See 2.2.1, or better, see Williams 1984 for details.)

postulated the following generalized categorization and subcategorization frame for the verb 'be' [+V, -N, +___ XP], where X stands for any major lexical category.

In describing the auxiliary and verb system of English, many linguists assume that it is necessary to account for the correct order of the different elements, as stipulated, e.g., by Chomsky's (1965 107) phrase structure rule for the analysis of Aux.[8] Since most forms of 'be' (all except 'being') are irregular, they must all be listed in the lexicon. But supposedly the distribution of the different forms of 'be' in D-structure does not differ from that of the corresponding forms of other verbs in English. Thus, it is not clear how much morphological detail must be stipulated in the lexicon to account for the specific ordering restrictions on 'be'. (See Falk 1984 for a Lexical-Functional analysis.) In any case, the distribution of the various forms of 'be' and the categories of its VP complements are illustrated in the sentences above. Now I wish to show how the strict subcategorization system could be used to account for the ordering phenomena in categorical sentences containing complex forms of the verb 'be', i.e., perfect, progressive and passive forms.

First of all, we can delimit the inherent properties of the VP complements that the various forms of 'be' strictly subcategorize for. For the various morphological forms of 'be' (or presumably any verb) the feature [finite] is definitive. As illustrated in 2.2.1 (i) (see the sentences in 12), non-finite forms of 'be' cannot occupy the finite verb position labelled "INFL." They may occur only as the complements of finite verbs. For the finite forms of 'be', the strict subcategorization frame may be elaborated as follows: '**be**': [+V, -N, +finite, ___ XP, where X may be N, A, P, or V [-finite]] The various suppletive and negative forms ('am', 'ain't', 'are', 'aren't' 'is', 'isn't', 'was', 'were', etc.) are listed with values for the features [past], [person], [number], [negation]. The non-finite forms of 'be' (base or infinitive, participles) have the following subcategorization frames: '**being**': [+V, -N, -

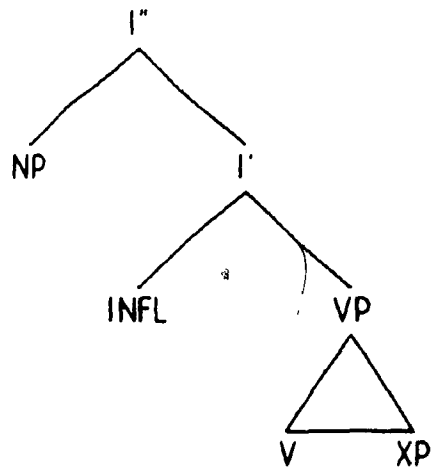
[8]This rule was supposed to account for the proper combination and sequencing of the constituents of the auxiliary-verb system in English. But more recent analyses, e.g., the analysis proposed by Gazdar, Pullum and Sag (1982: 629) within the context of Generalized Phrase Structure Grammar, do not "guarantee proper sequencing." Some linguists claim that an analysis in terms of the syntactic structures associated with 'be' is insufficient for this purpose. They argue furthermore that the order of the English auxiliary and verb constituents need not be stipulated syntactically as any order other than the correct one would result in semantic contradictions (Palmer 1974: 32; 1979, 1983; Schachter 1983). However, I claim that some basic syntactic well-formedness conditions can be stated in subcategorization frames.

finite, +participle, -past, +____ XP, where X may be N, A, P, V [+participle, +past]]; **'been'**: [+V, -N, -finite, +participle, +past, +____XP, where X may be N, A, P, V [+participle]]; **'(to) be'**: [+V, -N, -finite, -participle, +____ XP, where X may be N, A, P, V [+participle]].

These subcategorization frames for the different forms of 'be' constrain the forms of the categories that are selected as their complements. The distribution of 'be' in its different forms is determined by other elements in the verb system of English. For instance, the auxiliary 'have' subcategorizes for part participles, therefore, if 'be' is selected, only the form 'been' is grammatical. Models subcategorize for base forms, while other verbs subcategorize for infinitives, e.g., 'believe', 'hope', 'try', etc. The forms are also constrained by the structure of the sentence unit and the requirements of INFL. My next task is to account for the distribution of the elements that were supposed traditionally to appear in the Aux node and their complements.

I will argue that the phrase marker proposed in the introduction following the X-bar scheme of Chomsky (1986) can be extended to account for sentences containing 'be' and a VP complement.

3



In fact, the structure of a predicate phrase containing XP, when X is V, is the same as the structure of the predicate phrase containing a complement of any other major category. I claim that the subcategorization frame of the first verb that is selected to satisfy the [finite] property of INFL

determines the category of its complement. More generally, for every verb that is selected, its subcategorization frame determines the category of its complement, if it has one.

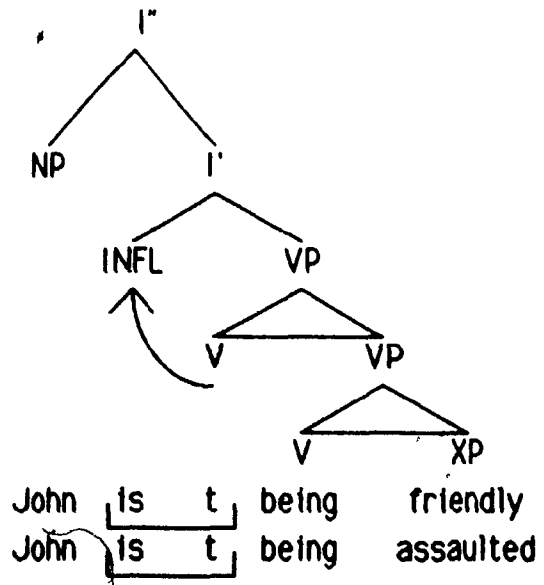
Consider the following sentences, in which the VP that functions as the predicate contains more than one verbal element.

4 (a) John is being friendly.

(b) John is being assaulted.

Here each VP contains a finite 'is' and copular 'being' plus a predicate complement. Or, in my analysis, I prefer to say that each sentence contains two different forms of the lexical item 'be'. In both sentences in 4 'is' would be traditionally analyzed as an auxiliary: "progressive" in (a), "passive" in (b). But in terms of the phrase marker in 3, 'is' is the head of the VP that is immediately dominated by I'. I assume that all forms of 'be' are base generated as heads of VPs. If so, then 'being' must be analyzed as the head of a VP, which is the XP that functions as the predicate complement of 'is'. For the sentences in 4, complements of different categories, AP (a) and VP (b), are selected by the heads of the VP predicate complements. But I assume that both sentences would have the same syntactic structure as in 5.

5



Although 'is' is base generated in the position of the head of the VP complement of INFL, since it is required in S-Structure for "Subject-Aux inversion," negative placement, etc., it must move into the empty INFL finite verb position. The phrase marker in 5 would differ from one representing a sentence containing a so-called "modal", such as 'can', in that the modal would be base generated in the INFL verb position. The modal would require a different form of 'be', as illustrated in 6

6 John can be friendly

The analysis represented in 5 may be extended to account for other types of elementary categorical sentences containing more than one verbal element (including the elements usually considered to comprise the Aux phrase). The categorical sentences that I analyze must contain at least one form of the lexeme 'be'. For the elementary sentences in 7 below, the elements of Aux as analyzed traditionally are listed in parentheses, and the various forms of 'be' are underlined.

7 (a) John <u>was</u> a friend. (simple past tense)

(b) John can <u>be</u> a friend. (-past modal)

(c) John has <u>been</u> a friend. (perfect tense)

(d) John <u>is being</u> a friend. (-past progressive)

(e) John has <u>been being</u> a friend. (perfect progressive)

(f) John can have <u>been being</u> a friend.
(-past modal + perfect progressive)

(g) John <u>was</u> elected. (simple past tense passive)

(h) John could <u>be</u> elected. (past modal passive)

(i) John <u>was being</u> elected. (past progressive passive)

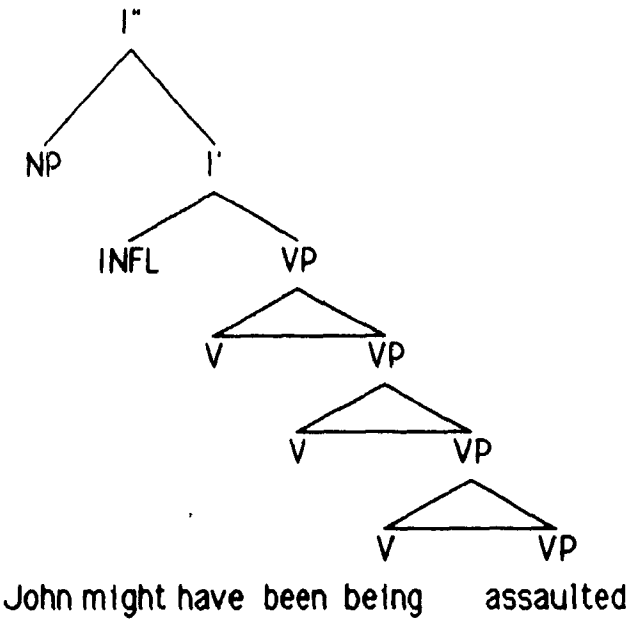
(j) John had <u>been</u> elected. (past perfect passive)

For the structural analysis of a sentence with the maximum number of different verbal elements that seem grammatical in English, the highest VP node would dominate a whole series of right-branching VP nodes, each being the maximal projection of a member of the lexical category V.

8 John might have been being assaulted

For this sentence, the phrase marker in 9 is proposed.

9



Since I do not intend to interpret modal properties in this work, extending the analysis here to cover the so-called "models" and "auxiliaries" is in a way an academic exercise. Nevertheless, I think that this possible extension argues favourably for the analysis. The analysis offers several other advantages.[9]

For my purposes, the main advantages of the X-bar schema proposed by Chomsky (1986) are the following. The head-complement structures represent the correct precedence and dominance relations that are implied by the strict subcategorization statements for all verbs, including those traditionally assigned to the categories of modal and auxiliary verbs. For particular lexical items within these syntactic categories may obligatorily or optionally subcategorize for VP complements, e.g., 'may' obligatorily, 'be' optionally only in the sense that its obligatory complement need not be a VP. 'Be', however, in ordinary use takes an obligatory complement of a major syntactic category.

[9]The arguments offered by Ross (1969) and Pullum and Wilson (1977) in support of the analysis of auxiliaries as verbs would also be valid here, although the structures they propose are not identical to the phrase markers in this chapter.

For some forms of the verbs in question, the full context can be stated, which would make them context-sensitive. If government relations determine lexical (morphological) forms such as Case for nouns and inflections for verbs, then it is important to notice that in a series of verbs, the morphological form of each one is determined by the immediately preceding one, as noted in 2 2.2 The form of each verb that appears in the Tense-Modal-'have'-'be' series seems to be conditioned by the immediately preceding one, as implied by the rule of Affix-hopping. Thus, for a particular language, morphosyntactic restrictions are probably best stated as strictly as possible in the lexical entries for individual verbs. But the most significant aspect of the speaker's syntactic competence that the phrase structures above capture is the effect of subcategorization. A competent speaker who chooses a particular verb (form) knows the category of the phrase(s) that it governs.

The structures proposed for categorical sentences contain positions for all lexical formatives that actually occur independently in the surface structures of sentences that competent speakers of English hear and use. In this perspective, INFL is analyzed as a finite verb position that is reserved for the base generation of elements that subcategorize only for VP complements. Elements that are analyzed as abstract grammatical formatives, e.g., tense, aspect, participle, are treated as inherent properties of particular verb forms and/or features of syntactic positions in phrase markers. All verbal elements in the series traditionally called "Aux" can equally determine their own complements or their own structural context by strict subcategorization, which states structural well-formedness conditions. This use of subcategorization in my analysis is borrowed from Williams (1984). In the morphosyntactic analysis of elementary sentences that I propose, if the INFL position is not filled by a finite verb, then the *first* verb in the series, i.e., the V that functions as the head of the highest VP in a simple elementary sentence structure, must be finite and agree in grammatical number with the subject of the sentence. Thus, tense, person, number, etc., are features of INFL or the highest verb position. For semantic interpretation, the *last* verb, besides 'be', in the series is significant to determine the denotation class of the predicate term, when this corresponds to VP. That is, 'be' or a categorematic verb of elementary sentences of the form [NP be VP], is the last V in a series. A verb may be the head of the XP that functions as the predicate term. Although the notions of *first* and *last*

are relative, as the heads of verbal domains, they seem precise enough to describe subject-predicate relations for elementary sentences containing 'be'.

This concludes my syntactic analysis of elementary sentences containing the lexical item 'be' Throughout this chapter I have assumed that semantic correspondences, even if they were clearly characterizable, could not be used in support of any categorial or structural analyses that might be proposed. By way of contrast, one of the points in favour of the X-bar analysis of sentences that I adopt here, i.e., $[_{I''}$ NP $[_{I'}$ INFL $[_{VP}$ be XP]]], is that it describes an indeterminately large number of sentences with very different semantic interpretations. The interpretation of the semantic relations that correspond to the grammatical NP-VP subject-predicate relations will be investigated in the next chapter.

Chapter 3

Semantic analysis of categorical sentences

This chapter concerns the semantics of elementary sentences containing 'be' An important claim of this thesis is that elementary sentences of the following types have the same lexeme 'be' in common.

1 (a) Jill is an architect

(b) Truth is elusive

(c) Someone is at the door

(d) Beth is working.

(e) The silver is being polished

(f) There is a cat on the mat

To justify the analysis of 'be' as a single lexeme from the semantic viewpoint, I will present a unified conceptual analysis for all "uses" of this verb My objective here is to propose a single correspondence rule to account for the subject-predicate relations of all categorical sentences in English.

The semantic analysis that I propose for this basic fragment is intended as a contribution towards a compositional semantics of English within the GB framework of generative grammar Compositional semantic interpretation is based on a syntactic analysis. The syntactic analysis I assume is described in Chapter 2. A generalized syntactic analysis of elementary sentences containing 'be' is defended there on syntactic grounds. To account for certain morphosyntactic generalizations, I claim that the most efficient description of 'be' would unify its various forms and their characteristic distributions in a single lexical entry. Accordingly, 'be' is analyzed as a single morphosyntactic unit belonging to the syntactic category verb. The categorization and subcategorization frame of 'be' are represented as follows.

2 'be': [+V,-N, +___XP], where X may be N, A, P, or V.

The labelled bracketing in 3 represents the structure of elementary sentences that I assume.

3 (a) $[_{I''}$ NP $[_{I'}$ INFL $[_{VP}$ be XP$]]]$

(b) $[_{I''}$ NP $[_{I'}[_{INFL}$ be$]\,[_{VP}$ t XP$]]]$

(c) [NP be XP]

3 (a) represents the D-structure of all sentences containing the verb 'be'. INFL, the head of the sentence unit, is a [+finite] V position. Just in case 'be' is [+finite], as in the sentence types in 1 above, then it must occupy the S-structure position labelled INFL, as illustrated in 3 (b), from which it governs the trace of 'be' (t) and the whole VP headed by t. The structure in 3 (c) abbreviates either (a) or (b).

This hypothesis implies that the particular category of the possible complements of 'be' does not have any syntactic significance for the categorization of 'be' in English. (For details, see Chapter 2.) I assume that the best syntactic description is one that states the significant syntactic generalizations and also organizes strings into units that are interpretable in an adequate and simple way. Provided only that we can find an adequate corresponding semantic description, the subcategorization frame in 2 together with the bracketed structures in 3 are supposed to provide an adequate syntactic description which can serve as a base for the interpretation of the subject-predicate relations of all categorical sentences containing 'be' in English. In point of fact, I shall argue for a one-lexeme analysis of the verb 'be' also on semantic grounds.

The first questions that I shall attempt to answer in this chapter are the following: (i) For the sentence types in 1 above, what are the basic units of conceptual structure that correspond to the syntactic constituents? and (ii) How are these units of conceptual structure and syntactic constituents correlated? A major task for linguistic semantics is to determine how the meaning of a whole sentence is formed from separate conceptual constituents that are associated with the individual syntactic constituents of the sentence.

In this chapter I will propose a single correspondence rule for the interpretation of subject-predicate relations in elementary sentences containing the verb 'be' in English. This rule will be stated in terms of the conceptual content of the verb. ('Be' is the only lexical item whose sense I will attempt to characterize here.) Conceptually, 'be' in English is an explicit sign of attribution. An affirmative

declarative sentence analyzed as [NP be XP] is interpreted or analyzed extensionally as follows. the referent(s) of [NP,I"] belong(s) to the type(s) denoted by [XP, [$_V$ be]]). The situation of belonging to (or not belonging to) the type(s) denoted by the predicate term (XP) applies to the referent of the subject NP of all elementary declarative sentences containing 'be' That the referent of the subject phrase also belongs to the type denoted by the subject phrase is presupposed, in the sense of "assumed" as opposed to "asserted." Thus, in the state of affairs that truly corresponds to a categorical sentence, the referent of the subject NP belongs to two different ontological types. This rule purports to account for the semantic relation that obtains when the subject and predicate phrases combine to form elementary sentences, i.e., it accounts for subject-predicate relations of all elementary sentences containing 'be'. Although additional conditions are contributed to the meaning of categorical sentences by the different forms of the verb 'be', my analysis abstracts from the person, number, tense, aspect and modality modifications of the verb 'be'. The categorical semantic framework that was summarized in section 1.2.2 (iv) will be illustrated in the following sections.

The grammatical relations of subject and predicate are pertinent for the semantic interpretation of elementary sentences. For elementary sentences containing 'be', the subject and predicate phrases each contain a constituent that functions as a term In well formed categorical sentences, there are always two terms that are related by the verb 'be'. The notion of *term* is central It comes from Aristotelian "two-term" logic (TFL), as described in 1.2.1 and 1.2.2 (ii). A term is a categorematic expression that belongs to an ontological category or type, as discussed in connection with Aristotle's metaphysics. As in Aristotelian logic, I assume that ontological types have an intensional (mental) aspect and an extensional (extramental) one. The relation of attribution is the conceptual relation that is designated by the verb 'be'. I claim that the differences in meaning between various types of categorical sentences depend on the intensions of terms of various types that are combined. (This point will be discussed in Chapter 4.) Although 'be' signifies the conceptual relation of attribution, most sentences containing 'be' express monadic propositions. These two claims are apparently incoherent and require an explanation. I attempt to explain it by comparing and contrasting the interpretation of sentences containing 'be' and 'hit' as follows.

For every categorical sentence, the conceptual relation of attribution is signified by the combination of subject and predicate phrases. In fact, in every well formed sentence (containing 'be' or any other verb), the predicate is attributed to the referent(s) of the subject phrase. Whatever is designated by the whole predicate phrase is attributed to the referent(s) of the subject phrase. Sentences containing the verbs 'be' and 'hit', in the same inflectional forms, may contain exactly the same number of expressions and hence, they presumably correspond to the same number of concepts. Then how are the subject-predicate relations of categorical and non-categorical sentences similar to each other and how are they different? Sentences containing 'hit' express dyadic propositions, whereas sentences containing 'be' express monadic propositions. The main distinction between monadic and dyadic propositions is extensional. The function that is designated by 'hit' applies to the referents of both the subject and the direct object phrases in sentences. The type that is designated by [be + XP] is attributed to the referent(s) of the subject phrase in categorical sentences.

The present chapter is in three parts. First and foremost, in section 3.1, I will describe compositional semantic interpretation as a process of determining the extensions of linguistic expressions. (By 'extension' here, I mean the entities, concrete or abstract, existing in reality or imaginary, etc., that speakers intend to talk about by using linguistic expressions.) The extensions of complex expressions are determined ultimately by the conceptual structures of the individual lexical items they contain. I will characterize extensions of categorical sentences in terms of their referent(s) and the ontological types to which they are said to belong. The semantic description of sentences containing 'be' will be approached similarly to the way the correspondence rules are supposed to operate on phrase markers, i.e., from the bottom to the top of the tree. In turn, I will describe the interpretation of lexical items (3.1.1), phrases (3.1.2), and sentences (3.1.3). Using the basic notions of *referent* and *type*, I will show how the extensions of lexical items, phrases, and sentences differ from each other and how the extensions of complex expressions are determined by the concepts corresponding to the smallest constituents of the sentence, the lexical items it contains. In section 3.2, for comparison and contrast, the semantic interpretation of sentences containing 'be' will be compared with that of sentences containing a transitive verb, e.g., 'hit'. Section 3.3 concerns the

semantic interpretation of sentences containing 'be' and other "relational" expressions, e.g., PPs such as 'at the door', 'on the mat', VPs such as 'hit (by John)' and 'hitting John'.

3.1 Compositional semantic interpretation of elementary sentences containing 'be'

This section will focus on some essential aspects of linguistic semantic competence involving the compositional interpretation of individual categorical sentences in isolation. The semantic interpretation of a sentence depends fundamentally upon the syntactic analysis of the sentence. This, in turn, depends upon the categories of lexical items selected and the way they are combined in sentences. An important task here is to show how the linguistic semantic interpretation of a categorical sentence is based on the interpretation of the individual lexical items contained in the sentence and their structural relations as analyzed according to the sentence grammar of English. I will also match syntactic constituents with conceptual constituents (types) and show how they function in the expression of individuation and categorization judgments.

Interpretation is a compositional process. This section (in fact, this entire chapter) will focus on the compositional interpretation of elementary categorical sentences in English. There are three possible candidates for the domain of operation of the compositionality principle: expressions, conceptual structures and the domain of discourse. The domain that is assumed implicitly within a theory of grammar is that of expressions. In this work, compositional semantic interpretation is described as a process of determining the extensions of linguistic expressions. The extensions of categorematic expressions are determined conceptually by their intensions. The intension of an expression is basically the information that the expression conveys (or the concepts that correspond to it), while the extension is what the information is about. For linguistic semantic interpretation, what is said (expressions in a given syntactic structure with corresponding intensions) is taken as a point of departure. I characterize the extensions of lexical items, phrases, and sentences in terms of the entities speakers would intend to talk about (the potential referent(s) or denotations as opposed to actual referent(s) of expressions) and the ontological types they belong to.

I assume that the interpretation of a sentence is effected conceptually, i.e., by grammatical correspondence rules in association with the conceptual properties of all the constituents of the sentence. The basic conceptual constituents are presumably those that correspond directly to the smallest units of expression that are repeatable independently, i.e., lexical items. The aspects of meaning (i.e., intensions and extensions) that would be available at the lexical level of analysis would depend upon whether the lexical item were categorematic or syncategorematic. All lexical items, both categoremata and syncategoremata, are assigned conceptual constituents at the lexical (terminal) level of sentence structure. The extensions of complex expressions (e.g., phrases) would then be determined by combining the concepts corresponding to their components. The intensions of the phrases together with the correspondence rules which operate compositionally on phrase markers determine the extension of the sentence. In giving the extensions of complex linguistic expressions, e.g., NPs, VPs, and IPs, the compositional interpretive process has the effect of relating the sentences of the language to the world of discourse.

At first sight, the compositional interpretive process seems facile, however, any substantial attempt to apply the principle of compositionality systematically always raises some analytical questions. A basic question is whether the same lexical item always makes the same contribution to the truth conditions of all sentences in which it occurs, especially when it may occur grammatically in different structural positions in different sentences. For example, do nouns that function as subject terms have the same denotative function as they do when they function as predicate terms? I assume that they do. Thus, some semantic conditions depend upon the immediate linguistic (syntactic) context. Another interesting question is whether or not there are characteristic intensions (hence extensions, if any) that correspond to a particular syntactic category. To go a step further, one might wonder whether or not it is possible to give satisfactory "notional" definitions of the syntactic categories, as some linguists suggest, e.g., Lyons (1968: 481. 1977: ch. 11).

Assuming that the analyst (linguist, philosopher, logician, or speaker) understands the proposition that is expressed (or the information that is conveyed) by a given sentence, the first problem is to break the proposition or the sense of a sentence up into its component parts. The notion

of *compositionality* depends on the analyzability of syntactic and conceptual structures contained in complex expressions. The most difficult problem generally seems to be the matching of linguistic expressions with individual units of conceptual structure. In the first place, it is often difficult in the semantic analysis of a sentence to determine which formal element of the sentence it is that a particular element of sense should be attributed to. Moreover, it is not always the case that there is a one to one correspondence between units of syntactic form and units of conceptual structure. In fact, there may not be a formal constituent (either lexical or structural) in the sentence that can be said to convey a given bit of information. As for lexical meaning, it is not always immediately obvious precisely what semantic contribution a single lexical item makes to the interpretation of the sentence as a whole.[1] Hence, we assume a weak version of the compositionality, but attempt to state correspondences between form and meaning as precisely as possible.

Following Katz and Fodor (1963), who outlined the first semantic theory in the context of (a) generative grammar, the rules of semantic interpretation are supposed to operate compositionally on phrase markers, from the bottom to the top of the tree diagram. The basic principle of compositionality states that the sense of a complex expression is a function of the sense of its constituents. Lexical meanings are assigned to each terminal element and then they are combined at the phrasal nodes, e.g., [XP,V'] and [V,V'] at [V'], [INFL,I'] and [VP,I'] at [I'], and so on, until an interpretation is assigned to the whole sentence (I"). Thus, in order to state general rules of compositionality for sentences, it is necessary to refer to units that are smaller than the sentence itself, e.g., lexical items and phrases of particular syntactic categories. It is important to note that I will not attempt to describe the psychological process by which speakers interpret sentences. Rather I shall present a conceptual analysis at each level of sentence structure, in order to explain how the

[1] Carlson (1983a) describes the kinds of notions that are commonly attributable across languages to the sentence as a whole, rather than to particular lexical items in the sentence. From this perspective, it is clear that the meaning of a sentence is more than the sum of the meanings of the lexical items it contains plus the "structural" meaning, i.e., meaning that is attributable to word order, government, etc. This idea merits careful consideration and further research.

information that is conveyed by complex expressions is ultimately derived from the information that is conveyed by individual lexical items.

I will describe the interpretation of categorical sentences in terms of referents, entities and ontological types. A prerequisite is to characterize the fundamental notions of *entity*, *type* and the conceptual relation of attribution which holds between the entities referred to and the ontological types they are said to *belong to*. These notions will be characterized in linguistic terms. Here I will also review my ideas about linguistic reference. I will begin by presenting some intuitive notions that are associated with these constructs. The expressions to be described are underlined here.

(i) type: A type has two aspects, intensional and extensional. Intensionally, a type is the notion of an ontological unit as a whole, i.e., its property or properties that are necessary to determine its extension. If it has a name, a type concept is designated by a categorematic expression (N, A, V, NP, PP, etc.) which names the type. Extensionally, a type is an entity (conceived as a unit on its own), or more precisely, all of the entities (in any quantity, e.g., there may be only one or none) that share the necessary properties signified by the categorematic expression that names the type. The properties that determine a given type are not taken to exist separately from the entities that instantiate the type. I will employ capital letters to represent types, e.g., A, B, C, etc.

(ii) Speakers talk about entities. By 'entity', I understand anything that is or can be apprehended by speakers. An entity has a distinct existence and either objective or conceptual reality, as determined by its type(s). An entity belongs to an ontological type if and only if it has the necessary characteristics of the type. Any entity may belong to a number of different types at the same time or at different times.

(iii) Belonging is a relation between entities and types. Any entity that has the necessary properties signified by a categorematic expression is conceived as belonging to the ontological type named by the expression.

(iv) A referent is "nameable" by an NP. The referent of an NP may be an entity, some or all of the entities that belong to some ontological type. For apprehension, the referent must belong to a

category within the speaker's conceptual competence. That it actually belongs to the type(s) denoted by the referring expression is only assumed, not asserted. A dot will represent referent(s) in this work

Here it seems important to emphasize the distinction between extensions and referents (Lyons 1977: ch. 7.2). The point to notice is this. Referents are identified by speakers using certain linguistic expressions, NPs. Speakers ascribe properties to the referents of NPs by predicating other expressions of them. A predicate is obviously not predicated of the NP that functions as the subject of the sentence, but of the extension of the subject NP. Or, more precisely, speakers predicate properties of the referents of NPs rather than their extensions, as this construct is described, e.g., by Carnap. However the referents of an NP are included in the extension of the head N I will describe the extension of a singular term as a single entity; exactly which entity that belongs to a type is the actual referent of a particular utterance must be determined contextually by principles of a theory of reference or a theory of language use.

The notion of *belonging* to a type is basic for the description of the cognitive processes of categorization and individuation. The relation of belonging that I describe is more general than the notion of *belonging* that is used in set theory. In set theory, belonging is a relation that holds between elements and sets. But, as illustrated in the Introduction and in Chapter 1, the notions of *element* and *set* or *class* are too restrictive for the interpretation of all categoremata in English. For example, the denotata of some abstract nouns and all mass nouns cannot be conceived as sets or classes of individuals. Mass nouns and count nouns are quantified differently. Instead of 'member' or 'element', and 'set' or 'class', in general, I will use the terms 'entity' and 'type', which comprehend all substances or entities whether they are concrete or abstract, and countable or not. For entities that are countable, a type would be extensionally equivalent to a set or class, but in order to provide a uniform description, I will refer to them as "types." As I concluded in Chapter 1, speakers refer to a variety of types of entities. The domain of reference is assumed not to be homogeneous. Any homogeneity that could be ascribed to it is applicable only in theory, i.e., by using theoretical terms such as 'referent' or 'extension'. The referents of linguistic expressions (the things speakers talk about) are not limited to a single type. The referents of expressions cannot be characterized exclusively as entities that "exist

in reality," as is sometimes assumed in classical semantics, or exclusively as entities that are experienced in a mental "projected world" as assumed by Jackendoff (1983). Finally, I assume that all categorematic expressions signify type concepts, as argued in Chapter 1. (See 1.2.2 (iv) and 3.1 for details.)

In this section I will propose some simple construal rules (based on the notions of *referent*, *entity*, and *type* introduced above) to account for the semantic interpretation of well formed elementary sentences containing 'be'. I will apply these notions to the lexical items at the terminal level of the phrase marker (3.1.1) and to the phrasal categories (3.1.2). Section 3.1.3 will focus on the interpretation of the sentence as a whole. Thus, the contribution of the lexical item 'be' to the meaning of sentences containing it is broken down into two parts. First, the contribution of 'be' to the interpretation of the predicate phrase will be considered in 3.1.2, and then the semantic interpretation of elementary sentences containing 'be', in 3.1.3. At the same time, the process of compositional semantic interpretation will be illustrated.

3.1.1 Interpreting lexical items

My objective in this section is to propose construal principles for determining the extensions of the lexical items that appear in categorical sentences of English. Consider the following set of sentences.

1 (a) The volcano is active.

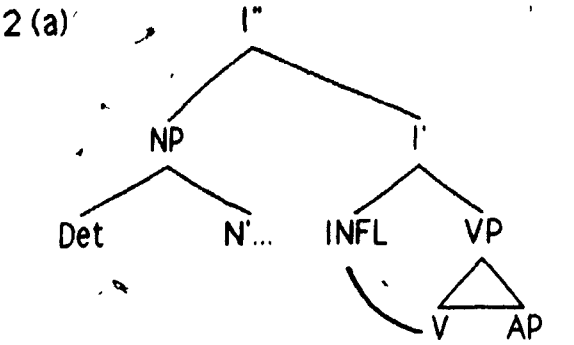
(b) The woman is working.

(c) The cat is on the mat.

(d) John is a student.

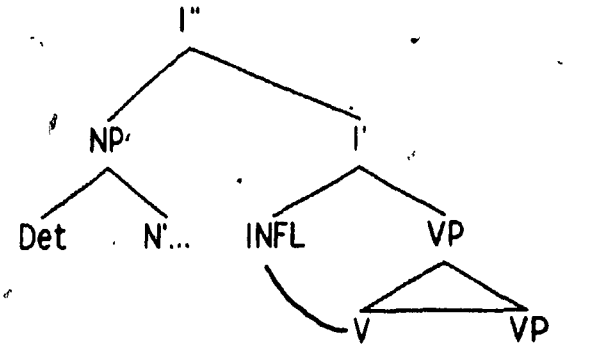
As expected within generative grammar, the semantic analysis will be guided by the syntactic analysis of sentences. The rules for the interpretation of the lexical items in these sentence types are stated in accordance with a syntactic categorial analysis. These sentences would be analyzed syntactically as follows.

2 (a)



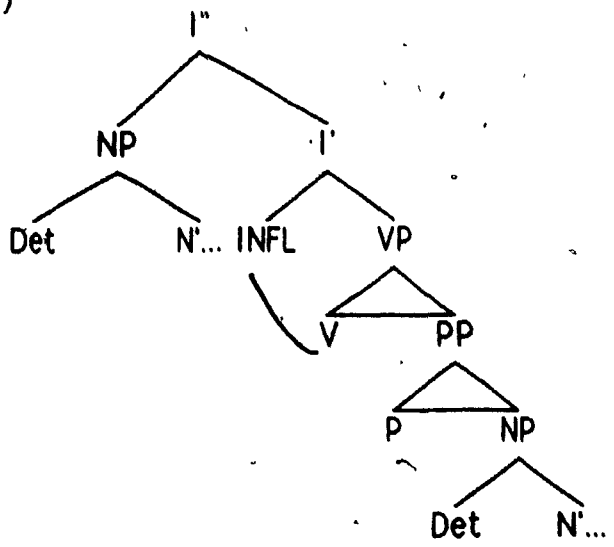
The volcano is active

(b)



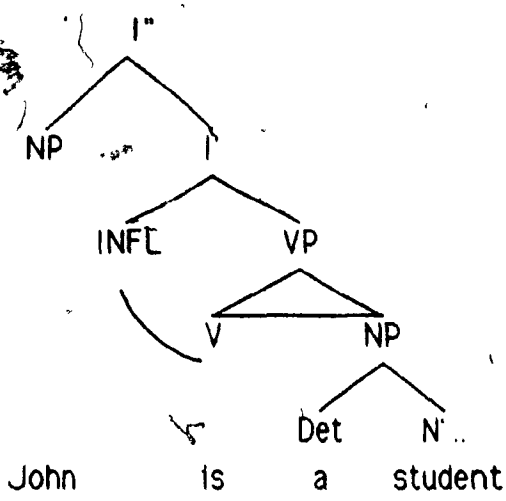
The woman is working

(c)



The cat is on the mat

(d)



The next step is to propose construal rules that apply to lexical items of the syntactic categories represented in the phrase markers in 2 above. Only five syntactic categories occur in the sentences in 1 as illustrated by the phrase structures in 2: determiners (Det), nouns (N), verbs (V), adjectives (A), prepositions (P). The first step is the assignment of conceptual constituents to the lexical items that belong to these syntactic categories. Since my primary objective here is to describe the semantic contribution of the verb 'be' to the sentence types in question, it is essential to characterize 'be' conceptually. But the analysis I propose here for the constituents of any other syntactic categories is only cursory and illustrative.

The theory of ontological categories and types that I assume has the effect of subdividing the vocabulary of a natural language into two classes: those expressions that have extensions (categoremata) and those that lack extensions (syncategoremata). (These classes are also distinguished as "lexical" versus "grammatical" words or "denoting" versus "non-denoting" expressions, or even "referring" versus "non-referring" expressions,) In general, expressions that belong to the syntactic categories N, A, and V are categorematic expressions. The verb 'be', however, belongs to the class of syncategoremata; conceptually, it designates the relation of belonging to an ontological type, but it must also be completed by another categorematic expression in order to function productively as a predicate in modern English. According to Aristotle, the copula may occur

with an expression that belongs to any ontological category. In my analysis, [... be + XP] is said to function as the predicate of the sentence. Expressions that belong to the syntactic categories of determiner (Det) and preposition (P) are also syncategorematic, i.e., on their own they do not belong to any ontological category or determine an extension. Even though they do not stand for anything extralinguistic, they have important syntactic and semantic functions. Determiners and prepositions combine with nouns (N') and NPs respectively and contribute to the determination of the extensions of the NPs and PPs that are formed. The resulting NPs and PPs belong to particular ontological types and categories.

The distinction between categoremata and syncategoremata is basic. It is especially important for the semantic classification of individual lexical items. As we have seen, logicians, e.g., Frege, Carnap, etc., seem to assume that a semantic analysis is justified only for categoremata. Clearly a conceptual analysis is justified for any expression that is repeatable, recurring in different sentential contexts. It seems crucial to provide an analysis for the expressions that are particularly linguistic, i.e., the functional or grammatical expressions that traditional logicians call "syncategoremata," such as 'is', 'the', 'a', etc. What are the similarities and differences between categoremata and syncategoremata? In this work, all linguistic expressions will be said to correspond to conceptual constituents (which I shall abbreviate as 'concepts'), but in isolation only the concepts that correspond to categorematic expressions can determine a type of extralinguistic entity. We know intuitively that these expressions, concepts, and designated entities (of various types) belong to one of the major ontological categories. The distinction between these two classes of expressions is primarily that categorematic expressions denote a type of entity on their own, but syncategorematic ones must combine with categorematic expressions in order to determine the extension of a phrase or clause. For syncategoremata, the linguist can describe what constituents of these categories contribute to the sense of the complex expressions which contain them. Thus for any expression the corresponding concept is taken to be the criterion necessary to determine its extension in the domain of discourse. More precisely, the conceptual structure of an expression E is the condition(s) that it contributes toward determining the extension of any complex expression in which E appears. The concepts that are

relevant may pertain to the essential properties of the entities that belong to the type(s) denoted by the expressions or stereotype or other information.

In the following description of the interpretation of lexical items and phrases, the notion of *belonging* to a type is taken as fundamental. It pervades the compositional interpretive process since it is implied by all categorization schemes. It also underlies the conventions of naming and reference. The characterization of entities (the predication of categorematic expressions of them) implies that the referents belong to the types named, but only in sentences containing 'be' are the referents explicitly asserted to belong to a certain ontological type. Even though the semantic interpretation of elementary sentences involves the determination of extensions, not only are the extensions themselves important, but also how these extensions are obtained. The interpretation of a sentence is determined conceptually on the basis of the concepts corresponding to the lexical items the sentence contains.

Interpretation of common nouns and adjectives. In this section, special attention will be given to the interpretation of the lexical items defined by the following property [+N]. Categorematic lexical items of the syntactic categories noun and adjective are important in the categorization process. They are commonly used to designate the type to which something belongs. At the lexical level of sentence structure, all [+N] lexical items are interpreted as types of entities. Consider the sentence 1 (a).

1 (a) The volcano is active.

The intensions of common nouns such as 'volcano' and of adjectives such as 'active' determine ontological types that are usually described as classes. The types denoted by the expressions 'volcano' and 'active' include all of the entities that meet the necessary conditions signified by these expressions. In other words, these expressions designate properties that apply to the entities of these types and only these types. For the sentence in question, I will use ellipses to illustrate the extensions of these lexical items. One might say that the sense of the common noun 'volcano' determines the ontological type V (all entities that have the necessary characteristics denoted by the noun 'volcano') and the general

adjective 'active' determines the ontological type A (which may include some volcanos, geysers, mud pools, people, machines, etc., which have the necessary characteristics denoted by 'active').

3 (a) [volcano]$_N$ [active]$_A$

Here my description of general nouns and adjectives follows rather closely the assumptions of traditional or classical semantic analysis. In fact, I conceive of the extensions of general count nouns and adjectives that apply to them as classes of entities, as assumed in classical semantics. There may very well be room to debate the naturalness of postulating such extensions for all expressions within these lexical categories, but this type of lexical analysis seems quite acceptable at this abstract level. The analysis captures the intuition that these lexical items may be used by speakers to talk about anything that counts as a volcano or is active.

Interpretation of verbs. As in classical semantics, I assume that the description of the extension of a categorematic verb depends on the number of logical subjects (terms or predicate arguments) it takes. The number amounts to the NP that functions as the grammatical subject of the sentence plus the number of complements in the subcategorization frame of the verb in question. This holds if the subjects and complements are categoremata or denoting expressions, which they usually are. An intransitive verb such as 'work' does not take any object or complement; thus, we say that a simple sentence containing 'work', e.g., 1 (b), has only one referent and it expresses a monadic proposition. The verb 'hit' always occurs in sentences containing an NP that functions as the subject and, if it is in the active voice, it takes a second NP that functions as the direct object; this object corresponds to a second (logical) subject. It is characteristic of transitive verbs that they have two logical subjects. A simple sentence containing active 'hit' involves at least two referents and expresses a dyadic proposition. Thus, the following construal rules are postulated:

(i) A lexical item which is defined by the features [+V,-N, +intr.] is interpreted as a type consisting of all the entities that share the characteristics designated by the verb (e.g., 'work').

(ii) A lexical item which is defined by the features [+V,-N, +tr.] is interpreted as a type consisting of ordered pairs of entities that share the necessary characteristics that are designated by the verb (e.g., 'hit').

(iii) A lexical item which is defined by the features [+V, -N, +tr.2] is interpreted as a type consisting of ordered triples of entities that share the necessary characteristics designated by the verb (e.g., 'put').[2]

Thus, for the following sentence,

1 (b) The woman is [working]$_V$

the verb 'working' would be interpreted as a type.

3 (b) [working]$_V$

The extension of 'work' or 'working' would be the type W which consists of all entities of which this verb or participle could be truly asserted. I assume that the extension of the participle is included in

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[2]These construal rules could be generalized as in predicate logic, where the logical forms of expressions are said to be determined by the number of individual terms that the predicates take. The verbs mentioned above would be described as one-, two-, or three-place predicates (or monadic, dyadic, triadic ...or unary, binary, ternary ... predicates). For the semantic description of natural language, many linguists propose that verbs be represented in the lexicon as propositional or sentential functions. These are open sentences in which verbs are represented as properties or relations with variables. Each of the variable symbols, 'x', 'y', 'z', is "a placeholder marking the position in the proposition where a constant may appear," (Wall 1972: 57). E.g., 'work'(x), 'hit' (x,y), 'put' (x,y,z). Only by substituting constant terms for the variables (called instantiation) or by quantification can open sentences be converted to propositions, which may be related to a world of discourse (Wall 1972: 82). In linguistic descriptions, the predicate argument structure (open sentence) is considered to be the lower bound, or the "minimal semantic information about verbs that must be represented in the lexicon ..." (Bresnan 1978: 14-15).

the extension of the base verb 'work'. [3] I shall return to the question of the interpretation of a transitive verb, e.g., 'hit', in 3.2.

3.1.2 Interpreting phrases

This section will focus on the semantic interpretation of complex expressions at the phrase level of sentence structure. It is important to notice that the intensions of phrases are not the same as the intensions of their lexical heads. Hence the extensions of lexical heads and those of their syntactic projections are not the same either. Phrases of all major categories may denote entities that belong to ontological types or categories. Phrases that contain categorematic expressions are also categorematic. Note that the extensions of phrasal categories are determined by the conceptual constituents of all the lexical items contained in the phrases, including syncategoremata.

The syncategoremata considered here include determiners, prepositions and the verb 'be'. These syncategoremata all belong to syntactic categories that take complements. The syntactic function of syncategoremata is primarily to attach to categoremata of the category N', NP or XP to form phrases. The interpretation of determiners, prepositions and the verb 'be' will be discussed then in connection with NPs, PPs and VPs, respectively. As individual lexical items, syncategoremata must carry syntactic and semantic information that is sufficient for distinguishing them from other expressions. For instance, 'on the mat' contrasts with 'is the mat' both syntactically and semantically. Here I will analyze the syncategorematic expression together with its categorematic complement as an operator-argument structure, as described by Harris (1982). The conceptual constituents that

[3] For interpretation, I do not take into account the tense, aspect or modality of verbs, not even of 'be'. I assume, however, that in general the various tenses and aspects of a verb would determine subtypes that belong to the general type denoted by the base verb. Although I do not propose to interpret modal properties here, I do not necessarily agree with linguists who make a clear-cut "modal-propositional" dichotomy in semantic analysis. I do not agree with those who would say, for example, "auxiliaries do not add to or alter propositional content, but are used to deny, question, repeat, confirm it." (Palmer 1983: 207-208). Instead, I would say that whatever adds to or alters the truth conditions of a sentence adds to or alters the propositional content, and if auxiliaries cannot do this, then languages would have no need of auxiliaries. I view the function of auxiliaries as essentially modifying the propositional content of sentences in systematic ways. For this reason, models and auxiliary vebs may be considered apart from full lexical verbs in a semantic analysis, although they belong to the same syntactic category verb (V).

correspond to syncategoremata combine with those of their categorematic complements in phrases. By this combination, the syncategorematic expression operates on its argument. The semantic content of the syncategorematic expression in some way modifies the intension of the phrase, without changing the intension of its argument. For instance, it may assert something about the referent(s) of the complementary categorematic expression. An exemplary operation is quantification. The semantic function of determiners is primarily to determine or specify the type that is denoted by the complementary N or N', i.e., to point out or to distinguish among entities of the ontological type it denotes. In particular, speakers use determiners to pick out some entity or entities of a certain type, but the determiners do not change the type denoted. Thus determiners have an important function in the individuation of types. For the sentence

1 (e) Each victim was a child.

the function of the determiner (quantifier) 'each' is to specify which entities of the type denoted by 'victim' are being talked about. Bellert (in 1985 and in other work in progress) describes the essential property of 'each' as [+distributive]. Thus, for the sentence 1 (e), the property of being a child is said to be "distributed" among the victims in the domain of discourse, applying to each one individually. Other determiners will be illustrated in the following section.

Interpretation of NPs. At the phrase level of sentence structure XP, if X is N, then XP may be genuinely referential. That is, it may be used intentionally by a speaker (in a speech act) to refer to something. It is most unusual for competent adult speakers of English to attempt to refer to anything by using phrases of other categories or simple lexical items. It is also possible for speakers to use a phrase to refer to someone or something as an individual, only in case it is a noun phrase (NP). This is because only Ns combine with determiners or quantifiers. Thus NPs are not only "referring" expressions, but also "individuating" expressions. NPs function as the grammatical subjects of the sentence, as objects of verbs, and objects of prepositions, or as predicate complements of the verb 'be'. In general, NPs are interpreted as types of entities. The extension of an NP is all and

only those entities which have the property (or meet the necessary composite criteria) designated by all the lexical items that constitute the NP Consider the NPs 'John' and 'a student' in the following sentence

1 (d) John is a student

The intensions of some indexical expressions, such as proper names, pronominals (or pro-NPs), demonstratives ('this', 'that', etc) have "built-in" concepts of quantity It is sometimes assumed that their extensions are not determined conceptually In the case of proper names, it is assumed there is a direct relationship between a name and the individual named However, I assume that even indexical expressions also correspond to type concepts Clearly 'John' is a very common proper name, and in reality, the name has many (potential) referents However the intended referent of the name 'John' used in categorical sentences is a single individual In any case, 'John', the proper name which functions as the subject of the sentence in 1 (d), would be interpreted as an individual or as an entity conceived as a unit on its own

Indefinite NPs, i e , NPs that are composed of a common noun and an indefinite determiner, are construed in two stages. First, the extension of the common noun is determined by its intension at the lexical level The common noun 'student', e.g., is interpreted as the type consisting of all entities that meet the conditions signified by this expression. For the interpretation of an indefinite NP, the concept signified by the indefinite determiner 'a' combines with the intension of 'student'. Hence the interpretation of the common noun is an unspecified entity that belongs to the type S I will represent the extensions of the NPs 'John' and 'a student' as follows.

3 (d) $[\text{John}]_{NP}$ $[\text{a student}]_{NP}$

The dot stands for the intended referent and the capital letters, for the types denoted by 'John' and 'student' (I do no mean to imply that speakers have such representations, only the type concepts.)

The extensions of definite NPs, i e , NPs that are composed of a common noun and a definite determiner, are specified also in two steps First, the extension of the general noun is determined by its intension at the lexical level E g , for the sentence,

1 (c) The cat was on the mat

'cat' and 'mat' are interpreted as the types C and M, which are all of the entities that have the necessary characteristics designated by the expressions 'cat' and 'mat', respectively Using ellipses, I will represent their extensions as follows

A phrasal expression of the category NP, when N is a count noun, is interpreted as a subset of entities that belong to a certain type The subset may be specified or unspecified contextually [4] For the sentence in 1 (c), the extensions of the two definite NPs are determined in two steps. To obtain the extension of the singular NPs 'the cat' and 'the mat', the definite determiners in (c) have the function of specifying entities that belong to the types C and M (cats and mats) The definite articles are illustrated as determiners of the cat and the mat that belong to the types C and M, respectively

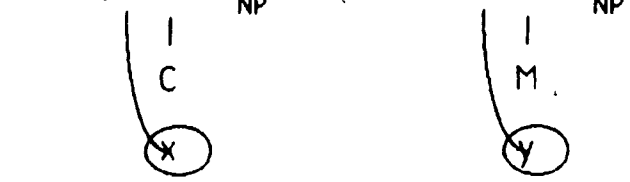
[4] I do not make a distinction in this work between the extensions of definite and indefinite NPs I assume that since the quantity is the same, the precise interpretation is eventually determined contextually as described by a theory of reference or a theory of language use. Furthermore, the referent of a definite or indefinite subject NP may be determined either anaphorically or contextually. An indefinite NP and a definite one may be used to refer to the very same entity, as in the following pair of sentences.

(i) There is a cat in the room

(ii) The cat is on the mat.

A fixed context is assumed here. The cat that is said to be on the mat in (ii) is the one that is said to be in the room in (i). For sentences in isolation, I shall assume that any set expression may be restricted contextually.

4 (c) [the cat]$_{NP}$ [the mat]$_{NP}$



But the extension of a definite singular count NP is a certain entity that belongs to the type denoted by the general noun. For the purposes of the semantic interpretation of sentences of natural language, after construal at the phrase level, it is no longer a question of all of the entities that belong to the type denoted by the general noun (This marks a departure from the conventions of model-theoretic semantics.) The determiner distinguishes an entity of the type denoted by N or N' on its own. The referents of the NPs in 4 (c) belong to types C and M To represent the interpretation of an NP containing a determiner and a count N, I will use the referent and type abbreviations, as follows

5 (c) [The cat]$_{NP}$ [The mat]$_{NP}$

Interpretation of PPs. The effect of combining expressions of the P category with NPs is the creation of conditions for a new type that does not belong to the type denoted by the NP object Some PPs (seemingly idiomatically) designate properties of a more or less abstract nature, e.g., 'beyond hope', 'in love'. But many prepositions seem to signify relations, including spatio-temporal relations and relations of means, purpose, etc., and thus they "operate" on their NP objects accordingly. For example, the predicate term in 1 (c) [$_{PP}$on [$_{NP}$the mat]] does not designate the property of mathood, but the location on the mat. The extensions of the expressions 'the mat' and 'on the mat' are quite different, of course, even though the NP in both is definite. Like general descriptive terms, a PP is interpreted as a type which I will symbolize as 'O', whose units are exactly those that meet the conditions expressed by the whole PP, e.g., being entities located on a certain mat. Thus the

extension of a PP is determined by the intensions of its head (the preposition) plus those of all of the lexical items constituting the NP that functions as its object.[5]

Interpretation of APs. The interpretation of complex expressions of the AP category is effected by combining the intensions of the individual lexical items contained in the phrase. It is similar to the interpretation of the lexical category A. The primary difference is that at the phrase level, the adjective A may have adverbial modifiers which restrict the entities denoted by A. That is, the expression that modifies the A determines only some of the entities denoted by the expression of the A category, for example, $[_{AP}\text{less}[_{A}\text{active}]]$ APs function primarily as predicate complements of copular verbs or as pre-noun modifiers The extensions of APs are always types, never individuals.

Interpretation of VPs containing 'be'. Phrases of the form [be + XP] are often described as "true" predicate phrases. Combining 'be' and the predicate complement is a step that is required for primary predication in English. (For a distinction between primary and secondary predication, see 2.1.2) Only by using VPs containing 'be' is it possible for a speaker to attribute something (a property, a relation, a location, etc.) to an entity or to a type of entity. For this reason, grammarians and logicians within TFL consider sentences containing such 'be' to be predications *par excellence* In sentences of natural language, activities, actions, affections, or relations are often designated by verbs, and entities (and types of entities), by NPs. The verb 'be' by itself, however, does not designate an ordinary ontological category. I claim that it signifies the conceptual relation of attribution, and the syntax requires that a predicate phrase containing 'be' also contain a complement XP, which may be the maximal projection of any major syntactic category: N, A, V, or P. A predicate phrase of the form [be + XP] is interpreted in the same way as a monadic predicate in predicate logic. Its extension is the type F, for all of whose constituents 'being XP' holds true. F is the property designated by the expression XP that functions as the predicate complement of 'be'.

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[5]The interpretation of sentences containing PPs that function as predicate complements of 'be' is discussed in 3.3.

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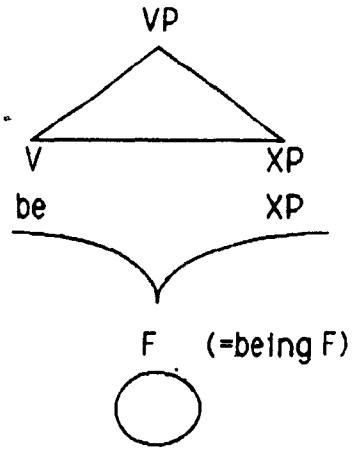


In 6, 'XP' stands for any phrase that is analyzed as the maximal projection of a lexical category N, A, V, or P, and 'F', for the property designated by XP One of the specific effects of adding 'be' to the predicate complement is that the property designated by the complete predicate phrase may now be referred to The phrases could be used, for example, to answer the question· What property is attributed to the referent of the subject NP? This question cannot be answered in idiomatic English with a bare XP. Probably because the NP is the paradigmatic referential expression, the verb 'be' may be used either in the base (infinitive) form or in the non-finite -ing form 'being, e.g., 'to be XP' or 'being XP' For the sentences in 1 above these properties are expressed as 'being + active', 'to be + working', 'being + on the mat', 'to be + a student'. In other words, the extension of the predicate VP containing 'be' as in 6 does not differ from the extension of the predicate complement XP without the verb 'be'. The property designated by the phrase that functions as the predicate complement on its own determines the type F that is the extension of the VP, but without the verb, this property is not attributed to the referent of the NP subject. The verb contains information concerning tense and aspect of the proposition expressed. By this, I do not mean to imply, however, that 'be' is meaningless. I shall argue against this idea in 4.1.2. We are now ready to consider the semantic interpretation of elementary sentences containing the verb 'be'

3.1.3 Interpreting categorical sentences

This section concerns the semantic interpretation of the following types of sentences containing 'be'

1 (a) The volcano is active.

(b) The woman is working.

(c) The cat is on the mat.

(d) John is a student.

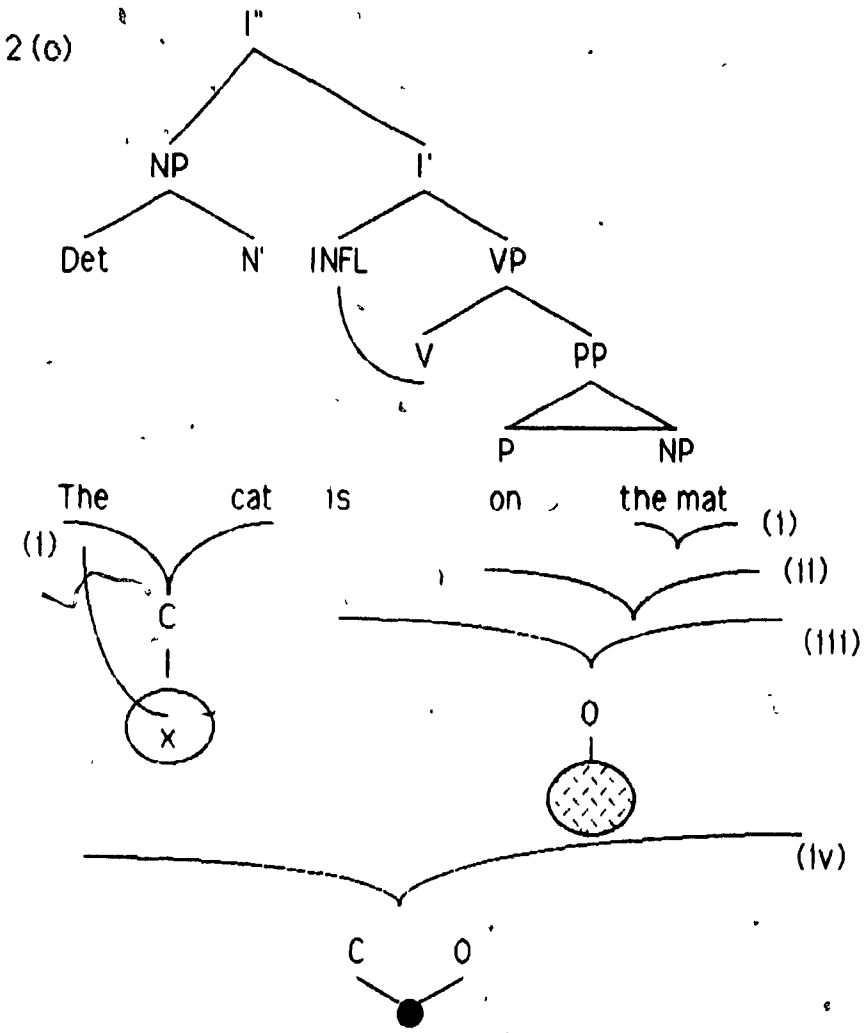
Sentences of the form [NP be XP], where X may belong to any major category, always contain two denoting expressions or categoremata. The NP and the XP in question are both type expressions. That is, each one denotes a type of entity and each one belongs to a major ontological category as described in 1.2.2 (ii). I suggested above without argument that the copula 'be' is used explicitly to express the relation of attribution. It effects the conceptual relation of a referent's or referents' belonging to an ontological type or types. By characterizing the sense of 'be' in this way, I am simply trying to make explicit what a speaker means by saying 'be' rather than some other verb in sentences.

The extensions of the phrases that function as the subjects and predicates of categorical sentences are described here as entities that belong to certain ontological types. For the sentences in 1 above, the referent of the NP that functions as the subject belongs to a certain type (which may be but need not be denoted by [NP,1"]) and the XP that functions as the predicate complement of 'be' is interpreted as an ontological type. In order for the speaker to be able to apprehend the referent of the subject NP, the referent must have some property that corresponds to a type concept familiar to the speaker, otherwise the speaker cannot identify what is being talked about. That the referent of the subject belongs to the type named is only assumed, not asserted. The type of being that is attributed explicitly to the referent of the subject is denoted by [XP,[$_V$ be]]. If this account of the semantic interpretation of the constituent phrases of such sentence types is correct, then the interpretation of the whole sentence must be described extensionally as a state of affairs in which the referent of the

subject is conceived as belonging to two types. Thus, the subject-predicate relation may be interpreted as an explicit relation of attribution that holds between a referent(s) (that must belong to some ontological type or other) and a specific type. For sentences of the form [NP be XP], expressing that A is B, the copula conveys the assertion that the referent of A belongs to type B. Or the predication asserts that an entity denoted by 'A' has the property B, which qualifies it to be included in type denoted by the expression 'B'. The term 'property' is used here in a very broad sense, perhaps as a 'kind of being' as described by Aristotle. The kind of being is actually specified by the expression that functions as the predicate complement of 'be'. Thus, 'be' is taken to designate attributive being, regardless of the syntactic category of X and regardless of the ontological category of either the referent of the subject NP or of what is being attributed to it. Attributing a property to an entity is the same as saying of that entity that it belongs to the ontological type which the property determines. Thus the conceptual relation that is designated by the copula 'be' might be characterized as *attribution* between a referent and an ontological type. Or at least the concept underlying each and every predicative use of 'be' is the attribution of a type or types to the referent or referents of the subject NP.

Next I will illustrate the compositional interpretation of the subject-predicate relations of elementary sentences containing 'be'. The interpretation of the VP, which contains two embedded phrases must take place in three stages: (i) the intensions of the constituents of the [NP,PP] are combined, (ii) the intensions of the constituents of the [PP,VP] are combined, and finally (iii) the intensions of the constituents of the [VP,I'] are combined as indicated in 2 (c) below. The rule of semantic interpretation of subject-predicate relations which applies as step (iv) to the sentence above can be generalized as follows.

> **An affirmative declarative sentence analyzed as [$_{I''}$ NP be XP] is interpreted as follows: the referent(s) of the linguistic expression analyzed as [NP,I''] belong(s) to the ontological type(s) denoted by the expression analyzed as [XP,[$_V$ be]].**



In terms of truth, a sentence of this form would be true if the referent(s) of [NP,I"] (a certain cat) belonged to the type denoted by the [XP,be] (being on the mat). If 'be' were negated, then for a true predication the referent of the subject would not belong to the type denoted by the predicate. At this stage of our knowledge concerning the semantic structures corresponding to these sentence types, the truth conditions could be stated only conditionally. The conditions stated in the rule of semantic interpretation are only necessary but not sufficient. My analysis, which focuses on 'be' and the terms, is exploratory and tentative. Perhaps the necessary and sufficient conditions must await the results of a complete semantic study of the quantification structures, modalities, tense and aspect.

My main task has been to analyze the verb 'be' conceptually. Applied to types in this description, 'be' is analyzed as an explicit sign of attribution. The subject-predicate relations of

sentences containing 'be' are interpreted as the assertion that the referent(s) of the subject NP belong(s) to the type(s) denoted by the predicate term. The extension of the whole categorical sentence is generally a state of affairs in which any entity or entities referred to belong(s) to two types. The main interest in illustrating the sentences extensionally is to show the logical relations that hold between the complex expressions of the sentence. I have used ellipses to represent the extensions of lexical items, capital letters to represent the types denoted by phrases, and finally a dot to represent referent(s) of subject NPs. To interpret subject-predicate relations then, the referent of the subject NP is any entity (belonging to one type or another) that is said to belong to the type denoted by the predicate XP. Or conversely, we might say that the type denoted by the predicate XP includes the referent of the subject.

The extension of a categorical sentence could be represented in several possible ways, depending upon whether the subject phrase is singular or plural, or the referent is a single entity or several entities belonging to the same type or to different types. In general, the referent of the subject phrase is smaller or more restricted than the type denoted by the predicate phrase in elementary sentences of English. Also for a "natural subject," according to Sommers (1982: 301), the type denoted by the subject term is smaller and more restricted than that denoted by the predicate phrase. The following sentences illustrate the notion of a *natural* subject.

.4 (a) (All) planets are celestial bodies.

(b) This is blue.

(c) A book is on the table.[6]

(d) The moon is shining.[7]

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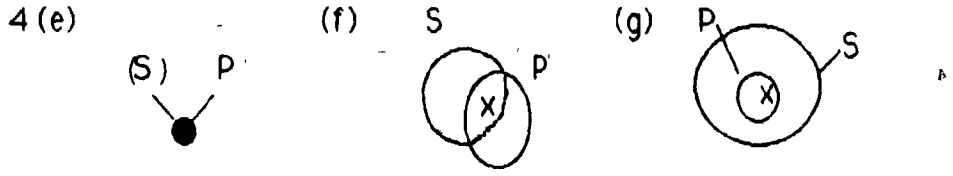
[6]The interpretation of sentences containing PPs or transitive VPs that function as the predicate complement of 'be' is discussed in 3.3.

[7]Irrespective of the types to which the referent(s) of the subject NPs belong(s), e.g., 'all planets', 'this', 'the moon', 'a book', these are not the only types of entities that could be said to meet the conditions for belonging to the types C (celestial bodies), B (blue entities), S (ones that are shining) or O (entities on the table).

Although I do not claim that speakers have any representations of the extensions of sentences, I would illustrate the extensions of all elementary sentences containing 'be' using the same configuration of symbols. The states of affairs denoted by these sentence types might be represented roughly by the diagram in 4 (e). Here the black dot (as in 4 (e) below) stands for the referent(s) of the subject phrase, 'S' for the type denoted by the subject NP and 'P' for the type denoted by the predicate term.



One might prefer to represent the state of affairs described by 4 (a) by overlapping circles (f), the referent(s) represented by 'x' as suggested by Copi (1983 chs. 5-6) or concentric circles with non-empty labels. In sentence 4 (a), the referents of the subject are all of the entities that belong to a certain type, i.e., all planets. In this case, everything that is said to belong to S also belongs to P But I prefer the representation in 4 (e) above, which depicts the same situation. The representation is simplified in that it includes only the basic essentials. It is perhaps oversimplified in certain respects. For instance, it is defective in that it makes no distinction between the two types that correspond to the subject and predicate complement phrases. That the referent belongs to the type denoted by the subject is only assumed, while it is asserted that the referent belongs to the types denoted by the predicate XP. Furthermore, I do not distinguish between referents of different types As I have argued in 1.2.2 (iv), speakers may refer to and talk about entities that belong to various ontological types and furthermore the same entity may be perceived under several different aspects. However, the representation is versatile and adaptable to suit the various situations that correspond to the categorical sentence types that are possible in English. The diagram 4(e) could also be modified so as to represent several different types simultaneously

A representation similar to that in 4 (e) is apt for the interpretation of all singular sentences of the form [NP be XP], irrespective of the inclusiveness of the individual nouns and/or descriptions involved or the relative size of the types denoted by the heads of the NPs or XPs. When the predicate

complement position is filled by an AP, a PP or a VP, then its extension is invariably more inclusive than and contains the referent of the subject NP, if the predication expresses a true proposition. But in general the predicate XP is less specific that the subject NP. In case the constituent that functions as the predicate complement of 'be' is a NP, then it may be used as the subject of the sentence. Consider the following sentences of the form [NP be NP].

5 (a) This cat is a tiger.

(b) This object is a cat.

(c) This is a cat.

(d) Mrs. Twitch is a cat.

If the sentence 5 (a) were interpreted simply as a relation between the types of things denoted by 'tiger' or 'cat', then the type denoted by the N' of [NP,I"] would be larger than the type denoted by the N' of [NP,VP]. One type would be the containing type and the other, the contained one. Sentence 5 (a) does not, however, express a relationship between all of the entities that belong to two types, unlike 4 (a) which does precisely that. Rather the NP that functions as the subject of 5 (a) denotes a particular entity belonging to the type cats, and it could possibly be the same one for all of the sentences in 5. Here it seems important to emphasize the distinction between expressions and their referents and extensions (Lyons 1977: ch. 7.2). The point to notice is this. Referents are identified by speakers using certain linguistic expressions. Speakers ascribe properties, relations, quantities, locations, etc., to the referents intended by predicating other expressions of them. A predicate is not predicated of the NP that functions as the subject of the sentence, but of the referent(s) of the subject NP. To illustrate this, for the sentences in 5, assuming that the referent of all the subject NPs is the same entity, the property of being a cat or belonging to the type C (cats) is ascribed to this entity, regardless of which expression (or corresponding property) is used to identify or describe the referent of the subject NP.

Sentences of the form [NP be NP], where the Ns are singular, are interpreted by the same principles. As usual, the referent of the subject is said to belong to the type denoted by the predicate

complement phrase. The two NPs are, however, interpreted differently from each other. The subject NP is interpreted as an entity, and the predicate NP as a type to which the referent belongs. The speakers attention focuses then upon the referent(s) of the subject, i.e., the entity or entities intended, but on the type denoted by the predicate term. The difference in interpretation results from the different dominance relations of the two phrases, the subject NP being dominated by I", the predicate NP is a sister to (is governed by) 'be'.

6 (a) John is a student.

(b) John is the only student enrolled in the seminar.

(c) John is John.

Let us assume that the sentences in 6 are about the same individual. I agree with Ayer (1976) and Sommers (1982) that proper names such as 'John' have intensions. In addition to a core meaning, a name may signify various properties by which speakers associate it with its referent on different occasions. The first token of 'John' in 6 (c) might be interpreted extensionally (i.e., as a certain person called 'John') while the second token might be taken to suggest some additional properties, such as Putnam's stereotypes, or other connotations. The referent of 'John' thus belongs to two types, symbolized by 'J' and 'P', which may be diagrammed as follows.

6 (d)

Determining the exact nature of the entities that speakers intend to refer to by using the expressions they do is not always an easy task. Consider, e.g., the following sentences containing the expression 'blue' which may function as an AP (predicate complement of 'be') or as an NP (subject).

7 This is blue.

8 (a) This colour is blue.

(b) Blue is this colour.

9 (a) The colour of this thing is blue.

(b) Blue is the colour of this thing.

10 (a) This is coloured blue.

(b) This object/thing is blue.[8]

It is not clear whether 7 should be considered to be an ambiguous sentence or whether it should simply be taken to illustrate the property of vagueness, which is surely a general characteristic of natural language. In any case, the sentences in 8-10 should specify the states of affairs that possibly correspond to 7. The sentences in 8-9 say roughly that the colour instantiated in blue, while in 10, they say that something is coloured blue, as Jan Crosthwaite (personal communication) suggests. In other words, the first sentences are about the colour of a certain object, while the latter are about a certain object. This is a direct result of whether the colour or the object is chosen as the object of reference, which is indicated by the subject phrase. But any of the sentences in 7-10 could be used to teach someone the colour blue or the name of the colour instantiated, as observed by S. J. Davies (personal communication). In any case, the expression 'blue' could certainly be considered to be vague.[9] It is not immediately obvious what property is designated by the AP 'blue' or exactly what the referent of the NP 'blue' could be. For the sentences in 8-9, are the (a) sentences equivalent to the (b) sentences? That is, would the referent of the expression 'blue' be different it is appeared in the

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[8]Sentences about colour may seem problematic in part because the type B (blue entities), e.g., may be seen as extensionally "fuzzy." (Fodor 1977: ch. 6). All sentence types seem problematical for a set theoretical semantics since sets do not necessarily have the properties that their members have, e.g., the set of blue things, is not itself a blue thing and colour is not blue or even coloured. For this reason, these sentences are difficult for any analysis.

[9]For instance, 'blue' could be used to refer to an abstract entity that belongs to the type denoted by 'colour', to the concept of a certain colour, or to the name of the colour, as one could illustrate, using the mnemonics of my triadic semantic analysis.

(a) Blue is a colour.
(b) *Blue* is the notion of a colour.
(c) 'Blue' is the name of a colour, which is a quality.

The aspect that is appropriate is probably obvious in a given context (for any domain of reference).

subject as opposed to the complement position? As used in the sentences above, the nouns 'colour', 'object' and 'thing' are extensionally more comprehensive than the adjective 'blue'. The semantic relation between the general terms of the sentences in 8-9 would be described as hyponymy between two types, i.e., 'blue' is a hyponym of 'colour'. Nevertheless, the referent of each of the subject NPs in the sentences in 9-10 above, 'this colour', 'this object', etc., would be conceived as a unit that belongs to the type characterized as 'blue'. The type blue, i.e., all entities that could be truly called blue, is more comprehensive extensionally than any single entity that belongs to the type. In 10 (b), the referent of the subject is identified by a specification of the genus, 'this object', whereas in 7 and 8 (c) and 10(c), the referents of the subjects must be identified ostensively in the domain of discourse. In any case, the whole configuration representing the subject-predicate relations is comparatively the same, that is, it is determined as follows: the referent of [NP,I"] belongs to the type denoted by [XP,[$_V$ be]], as illustrated in 11 below.

11

In reality, all the sentences in 7-10 denote the same state of affairs. For a fixed context, it is impossible for one of them to be true and the others false. The different types of entities that can serve as actual referents of expressions and how many types there are are questions that must be left for future research.

Before leaving the subject of the interpretation of categorical sentences, I wish to make one final observation. Here I will illustrate the distinction between reference (or denotation) and attribution. The representations of an N' containing an attributive adjective and a predication containing the same adjective functioning as a predicate complement of 'be' would be the same extensionally. That is, the following expressions would be represented by the same configuration of a referent that belongs to two types. However, the referent is only assumed to belong to the types denoted by the phrase that is interpreted referentially, whereas it is asserted that the referent belongs to the type denoted by the predicate phrase.

12 (a) This jacket is blue

(b) this blue jacket

12 (c)

In both 12 (a) and (b), 'this' picks out an entity that belongs to two types, one denoted by the general term 'jacket', the other denoted by the general term 'blue' Either 12 (a) or (b) may be used to describe the same state of affairs The main difference between the expressions is that (a) can be used to make an assertion about a certain jacket (that it is blue), while (b) can be used to identify a certain object as 'this blue jacket' but nothing is asserted of it The assertion in 12 (a) can be questioned, modified, or denied, whereas an NP as in (b), cannot

3.2 Sentences containing active transitive verbs

In the linguistic description of sentences within the theoretical framework of generative grammar, the verb is often given priority in both syntactic and semantic analysis Consider, e g , the following pair of sentences

1 (a) The driver was a man

(b) The driver hit a man.

I claim that these two sentences have the same underlying syntactic structure, as described in 1 2 1 and 2 2.2 The verbs 'be' and 'hit' fit into the same sentence frame, although as we have seen, 'be' occurs in others contexts as well. In 1 above, we have a minimal pair, i e , a pair of sentences in which only one word is different. Since there is a difference in meaning, this difference may

presumably be attributed to the semantic content of the different verbs that are syntactically intersubstitutable in some linguistic contexts, as illustrated in 1 above Semantically, of course, 'hit' and 'be' are thought to have completely different significata. Thus, sentences containing these two verbs will require different rules of semantic interpretation These rules would be stated in terms of the conceptual content of the verbs

There is an important overall difference in the kind of propositions that sentences containing these two verbs produce A sentence of the form [NP be XP] generally expresses a monadic proposition, as convincingly argued by Sommers (1982. ch 6) A sentence of the form [NP hit NP] expresses a dyadic proposition The main distinction between monadic and dyadic propositions is extensional. A sentences that expresses a monadic proposition corresponds to a state of affairs involving one referent or one set of referents, whereas a sentences that expresses a dyadic proposition corresponds to a state of affairs involving two sets of referents or ordered pairs

The interpretation of sentences containing a transitive verb will be described in accordance with the notion of a binary relation For sentences containing verbs such as 'hit', 'like', 'see', etc, the order of the referential expressions (NPs) is crucial and here it seems that the extensional notion of *relation* captures some essential aspects of semantic competence I will illustrate this with the verb 'hit' as used in the following sentence

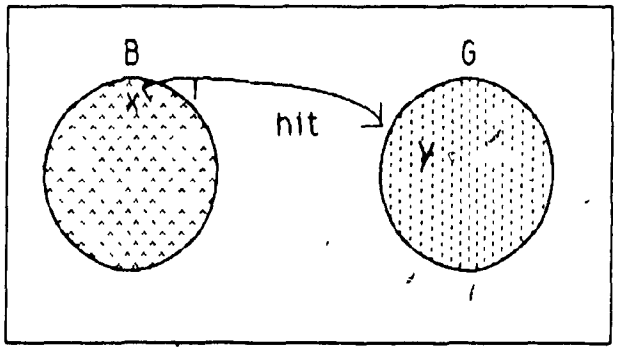
2 The boy hit the girl

The strict subcategorization of both verbs 'hit' and 'be' requires a categorematic expression of a certain syntactic category (or categories) in order for the predicate phrase it heads to be well formed. For categorical sentences, 'be' must combine with a categorematic expression XP to designate a particular type of being. Well formed active sentences containing 'hit' require two categorematic NPs, one that functions as the subject and the other, as the direct object. 'Hit' designates a two-place function which holds between pairs of entities, the referents of the subject and object phrases. As analyzed within generative grammar, the grammatical functions of subject and object are not

symmetrical The direct object NP combines with the verb to form a VP which is linked to the subject NP through the projection of INFL, the head of the sentence I will now describe the semantic interpretation of sentences containing 'hit' as a basis for comparison with 'be'

According to classical semanticists influenced by MPL, a binary relation as designated by 'hit' is specified by "the set of all ordered pairs in which the first coordinate stands in a particular relation to the second" or "as the mathematicians would have it, the set *is* the relation." (Wall 1972. 107). Given the domain of discourse say, the set of children, a Cartesian product is formed as follows.[1] For $||B|| = \{x \mid x \text{ is a boy}\}$ and $||G|| = \{x \mid x \text{ is a girl}\}$, the set whose members are all the possible ordered pairs with first coordinates (the domain) from B and second coordinates (the co-domain or range) from G is called the Cartesian product, symbolized as 'B X G' The following Venn diagram represents the general relation designated by 'hit' from B to G

3 (a)



The boy (x) hit the girl (y)

For the semantic analysis of sentences containing the verb 'hit', or any transitive verb, the notion of ordering is crucial In my analysis, the binary relation expressed by 'hit' is a relation from one entity to another, in the case described above, from the referent of 'the boy' to the referent of 'the girl' Actually, the following diagram showing only one ordered pair of referents represents the truth conditions for this sentence more precisely.

[1] Cartesian product: $A \times B =_{def.} \{(x,y) \mid x \in A \text{ and } y \in B\}$.

3 (b)

The diagram in 3 (b) represents a subset of the Cartesian product of two sets B X G. (Halmos 1960. 24). Thus, relational categorematic expressions such as 'hit' define a type which is all of the ordered pairs of which the predicate is true.

The notion of a *relation* accounts for two important aspects of the semantics of expressions such as 'hit' What is relevant to the specification of a relation are the referents for which the relation holds and their order. For example, the sentence

4 The girl hit the boy

describes the converse relation of 'hit' as exemplified in 3 In 4, it is a relation from the type labelled G to the one labelled B. Another relation of 'hit' is described for the referents belonging to S X M in 5

5 The storm hit the mountain

Linguistically speaking, not only the referents of the subject and direct object NPs, but also the order of the arguments is crucial for describing and understanding sentences denoting hitting relations. Since ordering is an essential element in the meaning of all relational expressions, I would argue that any lexical representation for such expressions with only a list of unordered "arguments" is simply inadequate to represent basic semantic competence.[2] No competent speaker of English who claims to know the sense of the verb 'hit' could conceive of a situation of hitting involving any two entities and fail to realize that one does the hitting and the other is hit. If one knows that A hit B, one also knows that A did the hitting and B was hit. The following is an abstract representation of the speaker's

[2]For instance, Williams (1981: 82) assumes an unordered list of arguments. The crucial ordering corresponds to word order in sentences of English, but in inflectional languages, the domain may correspond to the nominative case, e.g., the co-domain, to the accusative case, etc.

essential knowledge of the sense of the verb 'hit' (x,y).[3] As indirect evidence to support this representation, I will cite some sentences that competent speakers who know the verb 'hit' can say For example, if one knows that the proposition expressed by 6 is true,[4]

6 Max hit Sally

then one could not possibly deny that the propositions expressed in 7 were also true.

7 (a) It was Max who hit Sally

(b) Sally was hit by Max

These are ordinary sentences in English that focus explicitly on the ordering aspect of the relation Other sentences that are less common (in fact, they are paraphrases of the sentences in 7) are possible. If 6 is judged to be a true statement, then 8 and 9 will also be judged to be true

8 Max was the one who hit Sally

9 Sally was the one that was hit by Max.

Since relations presuppose entities (the ordered entities that are related), no sentences with active 'hit' are possible that do not mention the entities, unless, of course, they could be inferred from the context.[5]

10 Max hit (*)

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[3]Relational predicates may also have intrinsic attributes that form part of the speaker's semantic competence, e.g., symmetry, transitivity, reflexivity, etc. (Wall 1972: 110-124; Copi 1973: 130-135). The verb 'hit' in a set is non-symmetrical, non-transitive and non-reflexive. It is non-symmetrical since within a set of individuals, A may hit B without B's necessarily hitting A. "Hit' is non-transitive since A may hit B and B may hit C, but it does not follow that A must then hit C, although it may happen that way. "Hit' is also non-reflexive since it is possible for A to hit B, where A and B may or may not be numerically identical. Other relations may have other properties. The properties of 'be' will be considered in 4.3.

[4]Speakers' judgments about the truth value of sentences depend upon their understanding the sentence. For comments concerning the use the notion of *truth* in semantic analysis, see 1.2.3.

[5]Actually the possibility of omitting the object from the sentence containing 'hit' and inferring it from the context argues for the "reality" of the analysis of 'hit' as a relational expression, according to Bresnan (1982: 155). A similar point has been made by Grimshaw (1979: 279-326).

11 hit Sally (*)

In 10, if 'Max' were used to refer to a baseball player, for example, the object could perhaps be inferred from the context. But we are not interested here in the aspects of semantic competence that are dependent on the context of utterance.

In short, the speaker who knows the meaning of the verb 'hit' knows that it is a relation, whose extension is ordered pairs of entities. The speaker also knows that the domain of 'hit' is who or what hits and the co-domain of 'hit' is who or what is hit. The speaker who knows the verb 'be' knows that it is a conceptual relation but that sentences containing 'be' are very different extensionally from those containing 'hit'. 'Be' is often used to express the attribution of a certain property to an entity But in terms of extensions, if we say that 'be' expresses the relation of belonging between an entity that is the referent of the subject NP and a type that is denoted by the predicate term XP, then we must explain why sentences containing 'be' are generally analyzed as monadic propositions A type exists only as it is instantiated by entities. And the property, by virtue of which an entity is conceived as belonging to a given ontological type, is not conceived as existing apart from the entity in question In Aristotelian terms, the type denoted by the predicate is conceived as either essentially "in" or accidentally "of" the referent of the subject.

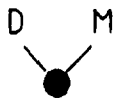
The syntactic description of the verbs 'hit' and 'be' are similar in certain respects, e.g., they both fit into the following syntactic frame. [+___NP], as illustrated in 1 above However, their behaviour is not entirely parallel, as described in 1 2.1 In particular, the NP that functions as the direct object of 'hit' and the NP that functions as the complement of 'be' have different interpretations that are correlated with the different conceptual analyses of the two verbs. 'Hit' signifies a function that operates between the referents of its NP subject and NP object. In contrast, 'be + F' ('F' is a type expression) signify the attribution of the type F to the referent(s) of the subject. Sentences containing transitive verbs such as 'hit' may have two logical subjects, whereas sentences containing the verb 'be' can only have one. This, in the final analysis, is the most important difference between the verbs 'hit' and 'be'. That is, sentences containing these two verbs express different kinds of

propositions. Sentences containing 'be' express monadic propositions, whereas sentences containing 'hit' express dyadic propositions. The distinction is visually evident in 12, which represents the extensions of the sentences in 1 (repeated below).

1 (a) The driver was a man

(b) The driver hit a man

12 (a)



(b)

Perhaps the semantic distinction between sentences containing the verbs 'be' and 'hit' could be characterized as follows. For the sentence in 1 (a) containing 'be', it is assumed that a referent belongs to the type D (drivers) and it is asserted that the referent of the subject belongs to the type M (men) while in 1 (b), it is assumed that the referent of the subject NP belongs to the type D (drivers) and that the referent of the object NP belongs to the type M (men) and it is asserted that 'hit' holds between them. Thus the verbs 'be' and 'hit' differ in their semantic content. I would characterize 'hit' as basically categorematic, and 'be', as syncategorematic. On its own 'be' asserts only that the referent(s) of the subject belong to a certain type or types, which it does not denote itself, whereas 'hit' asserts that the referents of both the subject and direct object phrases belong to a relational type, which it denotes itself. 'Hit' denotes an action involving two entities or two classes of entities. This action may be characterized also as a relation of contact. On its own, 'be' does not signify the type to which the referent(s) are said to belong. The ontological type to which the referent(s) is said to belong in categorical sentences is designated by [be + XP].

This monadic-dyadic distinction could be explicitly represented in the notation of predicate logic. The logical forms of sentences would be determined by the number of individual terms that may

appear in sentences containing these verbs. For example, the propositional functions for 'hit' and 'be' could be stated as follows. The dyadic relation would be represented straightforwardly as 'hit (x,y)', where the variables x and y are placeholders that mark the position in the open sentence where a constant may appear. If 'be' were represented explicitly in predicate logic, it would be necessary to attach it to a predicate variable F, as in 'be F (x)'. Since predicate phrases containing 'be' are complex expressions generated and interpreted compositionally, they are of course not listed in the lexicon of the grammar of English.

3 3 Sentences containing 'be' and relational predicate terms

Having contrasted sentences containing 'be' (that express monadic propositions) with sentences containing 'hit' (that express dyadic propositions), I will now turn to sentences containing the verb 'be' and other relational expressions that function as the predicate complement of 'be' Examples of relational predicate terms include PPs such as 'on the table' and VPs such as 'hit (by John)', 'hitting John' Consider the following examples. The predicate complements in sentences 1 (c)-(e) are,relational expressions.

1 (a) All tigers are cats

(b) The sky is blue.

(c) The book is on the table.

(d) Bill was hit (by John).

(e) The boy is hitting the girl

Clearly all of the sentence in 1 are semantically different by virtue of the intensions of the different expressions that function as subjects and predicate complements of 'be'. However, they are not different as I would maintain because the conceptual content of the verb 'be' varies from one sentence to the next. This would be inconsistent with my hypothesis that 'be' is a single lexeme in the grammar of English. Contrarily some linguists suggest that there are two 'be's, one of which designates a dyadic relation of identity (e.g., Rothstein 1983). On the other hand, Sommers (1982 :

ch. 6) argues convincingly that identity is not dyadic. In 4.3, I shall argue against the conceptual analysis of 'be' as the *identity* relation in favour of the relation of *attribution*. I want to maintain, however, that 'hit' designates a dyadic relation. In 3.2., I analyzed it as a dyadic verb. Sentences which contain relational expressions such as active 'hitting' express dyadic propositions. It cannot be maintained that all sentences containing 'be' express monadic propositions, since some of them contain transitive verbs and other relational expressions. Such sentences may nevertheless be interpreted by the same general principles as other sentences that contain 'be'.

It is certainly arguable that sentences containing PPs such as 'on the 'table' in 1 (c) are semantically different from the sentences in 1 (a) and (b), e.g., which contain a NP or an AP that functions as the predicate complement of 'be'. For instance, a sentence such as 1 (c) could be said to have "two arguments" which determine "two reference classes." In this case, it would be consistent to say that it expresses "a relation."[6] However, in my analysis, the predicate phrases of 1 (c)-(e) are simply more complex since the predicate term contains a relational expression. The sentences may be construed according to the same principles as proposed for other sentences containing 'be' Syntactically, all of the sentences in 1 may be analyzed according to the generalizations outlined in Chapter 2 That is, in each one, 'be' meets its strict subcategorization frame [+____XP], where X may be N, A, V, or P. Furthermore, both NP and XP contain categorematic expressions, whose intensions determine extensions, i.e., that belong to ontological types. Now what is different about these three sentences in 1 (c)-(e) is that the predicate complements XP (VPs or PP, respectively) all contain a NP, in which the noun could be quantified. First I will consider PPs that function as predicate complements. One can say, e.g.,

2 Five books are on two tables.

But I would argue, however, that the possible use of numerals or other quantifiers of N within the embedded NP should not prevent the whole PP from functioning as a predicate term. Regardless of how the proposition expressed by 2 is described, even as relational, e.g., it is still analyzable as the

[6]Such an analysis is proposed by Bellert 1986.

attribution of a property (or more precisely a location) to the referent(s) of the subject NP. From one perspective, sentence 2 vaguely summarizes this situation: there are several possible permutations of five (different) books on two (different) tables. But if sentence 2 is true, then it entails at least five different propositions that are expressed by 1 (c). The problem of the interpretation of these implications and of 1 (c) remains. The question I will consider is: How is sentence 1 (c) ('The book is on the table') to be interpreted?

Basically, I want to argue that 1 (c) does not express a dyadic proposition, i.e., it is not <u>about</u> a book <u>and</u> a table, but rather about a book, describing its location. For the sake of argument, suppose we agreed that both 1 (c) and 2 express two-place relations. Then for my analysis, an important question would be: Which expression(s) would designate the relation? The categorematic (or "referring") expressions together with their determiners, determine two classes A and B. The extensions of the NPs in sentence 2 are diagrammed as follows

3 [The five books]$_{NP}$ are on [the two tables]$_{NP}$

When we subtract the two categorematic phrases which determine the two sets A and B, then we are left with the verb 'be' and the preposition 'on' as possible candidates for the expression of the "relation" of *being on*. 'Be + on' is never analyzed as a constituent in any sentence of English. This does not mean that the combination does not function as a complex relational expression, however. But let us suppose that 'on' designates a relation, which is not an unreasonable suggestion. Even if this is granted, it does not necessarily follow that sentence 1 (c) could be said to express a dyadic proposition of the same kind as 4 containing the verb 'hit'.[7]

[7]The verb 'hit' may be analyzed as a two-place predicate, which applies to the referents of the subject and object of the sentence in which it appears. On its own, the P 'on' cannot be analyzed as a predicate, rather it needs a PP, which is itself embedded in a VP containing 'be'. The intension of the whole VP (predicate phrase including the embedded PP) applies to the referent of the subject of the sentence in which it appears.

4 The book hit the table.

The question is whether or not for the book the relation of being on the table is parallel to the relation of hitting the table. I wish to argue in favour of a semantic analysis parallel to the syntactic analysis of 'on' as the head of the PP, which functions as the predicate complement of 'be' 'Be' in this analysis signifies the relation of belonging to a type. Basically I will argue that the PP functions as the predicate complement of 'be' and the whole PP is interpreted as the location of the referent in 1 (c)

Consistent with my hypothesis, 'on' could be analyzed as an operator on its own, with the NP as its argument. But it is not clear that a uniform analysis is possible. First, not all objects of 'on' could function as one of its "relational" arguments, e.g., 'on welfare', 'on board', 'on fire'. In any case the possible objects of 'on' do not seem to constitute a natural semantic class. For example, one might think of limiting the class just to projections of Ns that denote concrete objects such as 'table', 'mat', 'bed', 'cloud', 'moon', etc. But again, in English, this class of nouns does not correlate exactly with the class of Ns that take determiners in PPs that function as predicate complements, e.g., 'on the board' versus 'on board', 'on/in time', 'in the time allowed', 'on/in the moon', 'on a cloud', 'on (the) land', 'on (the) sea'. Because of all the alternative constructions of PPs with and without determined N objects, the alternate forms having different intensions in some cases, it seems that the rule(s) would be enormously difficult to formulate. But this does not mean that such an analysis would not be correct, or course. Even for the fairly clear-cut concrete cases, where a dyadic relational analysis seems plausible (e.g., books on tables, cats on mats) one irregularity that would not be explained by this analysis is the following. If sentences containing 'be + on' do indeed express dyadic propositions, then why do they fail to behave syntactically like other sentences that are generally considered to express dyadic propositions? In particular, the objects of dyadic predicates can function as subjects of sentences.

5 (a) The driver hit a man.
A man was hit by the driver.

(b) John resembles Bill.
Bill resembles John.

These sentences, of the types that were earlier described within generative grammar as "transformationally related," usually permit the conversion of subject and object NPs. 5 (a) and (b) are examples of active-passive sentence pairs and equivalent active sentences, respectively. But such transformationally related sentence pairs cannot be found in standard English for elementary sentences containing 'be' followed by a PP predicate complement. This is illustrated in 2.3.2.

5 (c) The book is on the table.

Is the book on the table?

Is on the book the table? (*)

The table is the book on. (*)

The table the book is on (*)[8]

(d) [On the table] is the book.

[On the table] is where the book is

Where is the book? [On the table]

Where is the book? [the table] (?)

(e) The book is on the table and the glove is on ____, too. (*)

The book is on the table and the glove is ____, too.

I take it that the acceptable sentences in 5 (c)-(e) indicate that the preposition 'on' belongs in the same phrase as 'the table'. That is, syntactically, the NP cannot be extracted readily from PP. And semantically, the bare NP 'the table' sounds odd as the answer to the question in 5 (d). It is incomplete. More information seems to be required for an acceptable answer that would not depend on the context of utterance as to whether the book were above, by, near, on, or under the table. From these sentences in 5 (c)-(e), we can deduce that 'is' and 'on' do not form a constituent.

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[8]The phrase 'the table the book is on' is acceptable as a relative clause construction, and 'The table has a book on it' is also acceptable.

At least for the present, I will maintain my hypothesis, viz., that all sentences containing the verb 'be' can be interpreted by the same principle of attribution. This claim holds for all sentences of the form [NP be XP], regardless of the syntactic category of X and regardless of the ontological (or semantic category) that corresponds to the referent(s) of NP or the type(s) (denoted by XP) being attributed to it (or them) in the sentence. But this thesis also requires justification, which I shall now attempt to provide.

For the interpretation of sentences containing PPs such as sentence 1 (c), what is being attributed to the book is its being in a particular location, i.e., on a certain table. Perhaps it seems strange to consider 'being in a location' as something that can be attributed to a thing.[9] But the same general location (roughly speaking, approximately, not the precise physical points) can be shared by several things at the same time. Like all other phrases analyzed as [XP, [$_V$ be]], [PP, [$_V$ be]] may be interpreted as an ontological type or types to which the referent(s) of the subject belongs. The ontological type may apply to several entities of different types at the same time

6 (a) The book and the vase are on the table.

(b) The books and the vases are on the table.

(c) Five books and one vase are on the table.

In 6, being on the table is attributed both to books and to vases. But perhaps one might find the notion of attributing locations to entities in this way not to be intuitively acceptable. I need to find some other linguistic evidence for analyzing PPs such as 'on the table' as attributive predicate terms of sentences expressing "monadic" propositions.

Next, I would argue that a PP such as 'on the table' functioning as a predicate complement designates an attribute just as an AP, a NP or a VP in the position [be ____] does. Let us say that 'on the table' designates a "attribute of location," albeit relational. (Being relational is perhaps a necessary

[9] For instance, Lyons (1977: 474-480) writes as though this very idea were objectionable. He proposes a separate syntactic category for "Locative" predicate complements of 'be'.

property of being the location-of something.) Yet sentences that contain relational expressions, e.g., those underlined in 7, may express monadic propositions.

7 (a) My mother is a teacher.

(b) His sister's husband is the author of the latest book

(This is one of the main points that Sommers makes in 1982 (ch. 7) and 1983.) What is interesting from the syntactic point of view about attributive PPs such as 'on the table' is that, in addition to the predicate complement position, they also occur within the NP, where they also have an attributive semantic function. That is, the expression 'on the table' embedded in a NP such as [$_{NP}$the book[$_{PP}$on the table]] would have the semantic function of delimiting the class denoted by N, e.g., books, just as expressions belonging to the other categories, AP, PP, and VP would when embedded in NPs, as in the following examples. Their grammatical function here is to specify the N.

8 (a) the [$_{AP}$blue] object

(b) the [$_{VP}$smiling] madonna

(c) the book [$_{PP}$on the table]

(d) the [$_{N'}$animal] cat versus the [$_{N'}$machine] cat

The PP differs from the other classes of phrases in 8 in that it is syntactically constrained to follow rather than precede the noun it modifies. But in contrast to all of these attributive phrases that can function as the predicate complement of 'be' and as the modifier of a N, a NP that functions as the object of a verb such as 'hit' cannot be embedded in a NP, e.g.,

9 (a) The [$_{N'}$man] driver (*)

(b) The [$_{N'}$hit a man] driver (*)

That is, assuming that 'a man' names the entity that the driver hit, as described in sentence 5 (a), then 'man' does not designate a property that is attributable to the referent of the subject NP. Whether we consider the expression that functions as the object of a relational verb such as 'hit' as an

"argument" or as a "set expression," it seems important to notice that it will not be interpreted in the same way as an expression that functions as the object of a preposition (i.e., a PP that functions as the predicate complement of 'be')

Finally, I will consider examples of transitive verb phrases that function as the predicate complements of 'be' that are always relational expressions. In Chapter 2, so-called "passive" and "progressive" sentences are analyzed as elementary sentences containing 'be'. Analyzed syntactically, the "passive" and the "progressive" contain the past and present participles of a verb preceded obligatorily by a form of 'be'. These participial verb forms can only function as the predicate complements of 'be'. Corresponding active and passive sentences must contain a transitive verb, one that signifies at least a binary relation. Consider the verb 'hit' again.

10 (a) A bus hit the truck

(b) A bus is hitting the truck

(c) The truck was hit by a bus

(d) The truck was hit

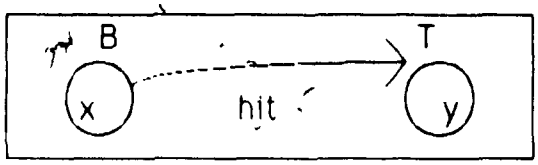
(e) A bus hit (*)

For determining the character of the proposition expressed by sentences containing 'be', I would give priority to the phrases that function as subject and predicate terms. If both arguments of the verb are present, then a sentence containing the participles 'hit' and 'hitting' would be analyzed as dyadic propositions. All active sentences containing 'hit' express dyadic propositions. Active 'hit', e.g., 'hit' in 10 (a) and 'hitting' in (b), is any form of the verb except the past participle preceded by the verb 'be', and. Thus, 10 (a) and (b) are analyzed as dyadic propositions, although (b) contains the verb 'be'. These two propositions differ only according to the different tense and aspect marked by the verb forms. Although the predicate of a passive sentence contains a relational expression, it could express either a monadic proposition or a dyadic one. The NP that functions as the subject of the "passive" sentence (e.g., 10 (c)-(d)), is the same as that which functions as the direct object of "active" 'hit'. The constituent that functions as the predicate term is a maximal projection of the past

participle of a transitive verb The interpretation of both active and passive sentences may follow the same compositional principles as for categorical sentences That is, the whole predicate (whatever is denoted by the VP and its complements) is predicated of the referent of the subject NP

In 3 2, the extensions of active sentences containing 'hit' were represented as a subset of the Cartesian product of two sets, or a pair of ordered referents linked by 'hit' For the interpretation of all the well formed sentences in 10, a speaker might refer to the same model

11 $[\text{The bus}]_{NP}$ hit $[\text{the truck}]_{NP}$



In 3 1 1 , I suggested that the type denoted by a participle is a subtype of the extension of the corresponding base verb For the sentence 10 (b) whose predicate term is an active form of 'hit', the subject-predicate relation would be analyzed extensionally as follows: the referent of 'the bus' is the first entity of the ordered pair, represented as (x,y) Let us assume that the interpretation of passive and progressive sentences follows the rule for the interpretation of sentences containing 'be' That is, the subject is interpreted as a referent and the predicate term, as an ontological type

10 (c) $[\text{The truck}]_{NP}$ was $[\text{hit by the bus}]_{VP}$

(d) $[\text{The truck}]_{NP}$ was $[\text{hit}]_{VP}$

For predication, the rule says that the referent of the subject belongs to the type denoted by the predicate term How are the referent of the subject NP and the type denoted by the predicate term for 10 (c) and (d) related to the subset of the Cartesian product or the type designated by the general verb 'hit'? Since the verb 'hit' designates a type such that every unit is an ordered pair, then the extension of this relational verb involves two subtypes, let us call them "the hitters" and "the hit " The subjects of progressive 'hitting' and of passive 'hit' then are said to belong to the types called "the hitters" and "the hit," respectively, both of which belong to a relational type that consists of ordered pairs A X B

Extensionally the sentences in 10 (c) and (d) might be interpreted as follows: the referent of 'the bus' belongs to the type signified by the past participle 'hit' that is governed by the verb 'be' Thus, even though the active verb 'hit' signifies a dyadic relation, the proposition expressed by a passive sentence containing 'be + hit' (the past participle being the head of the predicate term)may be viewed as monadic Certainly in sentence 10 (d) the past participle applies to only one entity of an ordered pair (which is the extension of the verb 'hit') However, both sentences (c) and (d) could be said to express monadic propositions, if the 'by'-phrase in (c) were analyzed as a modifier of the predicate In fact, the agent phrase could be said to specify an entity belonging to the type described as "the hit "

Since the participles each name a "relational" subtype, it seems strange when they are used attributively in the pre-noun position

12 (a) The hitting bus (?)
(b) The bus (that is) hitting the truck

13(a) The hit truck (?)
(b The truck (that was) hit by the bus

Perhaps the (a) NPs seem strange because the pre-noun position is a [+N] position (Alternative analyses of the passive in English will be discussed in 5 2 1)

This concludes my discussion of sentences containing 'be' and relational expressions that function as the predicate complement In the next chapter I will argue that the categories of the terms determine the types of propositions expressed by categorical sentences In this perspective, passive sentences containing agentive phrases would be considered to express dyadic propositions. Although all sentences containing 'be', as for any other verb, may be analyzed compositionally in such a way that the types denoted by [be + XP] are seen to apply to a single subject, it is not the case that all sentences containing 'be' express monadic propositions in the sense that monadic propositions must be about one reference set or entities of just one type.

Chapter 4

Alternative conceptual analyses of 'be'

My objective in this chapter is to justify not only the analysis of 'be' as one lexeme but also the particular conceptual analysis that I proposed in Chapter 3. There I described the sense of 'be' as the relation of attribution that holds between ontological types and referents. Next I shall attempt to defend this hypothesis in part by comparing it with some alternative conceptual analyses of 'be'.

The semantic analysis of a single lexical item can be an embarrassingly difficult task in linguistic research. Even though competent speakers understand the proposition that is expressed by a given sentence, it is not always immediately obvious precisely what contribution is made by a single lexical item to the sense of the sentence as a whole. This is especially so in the case of a verb that is used as frequently and in so many different linguistic contexts as 'be' in English. The main task is to describe the contribution that the verb 'be' makes systematically (in all contexts) to the interpretation of all well formed predicate phrases and to the truth conditions of all well formed sentences in which it may appear.

The question I shall consider first is whether or not the element that is underlined in each of the following sentences is a form of the "same" verb 'be' from the semantic viewpoint.

1 (a) There is indeed a Santa Claus.

(b) Snow is white.

(c) Scott is the author of *Waverley*.

(d) That is true.

(e) He is being crafty.

Sentences of the types illustrated in 1 have been discussed in great detail and from several different points of view by scholars from various fields of research. As I mentioned in the introduction, the

question of the different "senses" and "uses"[1] of 'be' (or its equivalents in other Indo-European languages) has long been a subject for debate among linguists, logicians and philosophers of language. For followers of Plato and Aristotle, for example, the central issue concerning the meaning of the copula in ancient Greek was whether it was univocal (as Plato's followers would maintain) or equivocal (as Aristotle maintained) and if it were equivocal, then what kind of equivocation or ambiguity would be involved. Among modern logicians and philosophers, Bertrand Russell is one who maintains that 'be' in English is distinctly ambiguous. His complaints about this ambiguity are almost as celebrated as his discussion of descriptions. Russell (1920. 172) writes.

> ... it is a disgrace to the human race that it has chosen the same word 'is' for ... entirely different ideas--a disgrace which a symbolic logical language of course remedies.

For the sentence types illustrated in 1 above, the kind of analysis that one usually finds in elementary textbooks of MPL classifies the different 'be's according to the kinds of assertions that the sentences containing 'be' are supposed to make. For example, the sentences in 1 are said to express statements that are labelled as follows: (a) "existential" (b) "predicative," (c) "equative" or "identity," and (d) "veridical." On an analysis according to MPL, the sentences in 1 are taken to illustrate corresponding "senses" of the verb. The existential 'be' is said to be used in (a) to assert the existence of (a) Santa Claus, the predicative 'be' is used in (b) to predicate the colour white of snow; the equative 'be' is used in (c) to assert the identity of an individual (Scott) and an individual who is described as "the author of *Waverley*;" the veridical 'be' is used in (d) to assert the truth of some proposition. It is unclear how logicians would analyze (e) in MPL. But linguists often distinguish the syntactic functions of 'is' in (e) as an auxiliary and 'being' as a full verb. According to Williams (1984: 138), they can also be distinguished semantically by the fact that 'be' as a full verb ascribes "intentionality" to the referent of the subject NP.

According to Cresswell (1973: 182), the sentence types illustrated in 1 (a)-(c) represent "the three main uses of *be*" in modern English. These distinct "uses" of 'be' correspond to distinct

[1] In the original texts referred to here, the expressions 'senses' and 'uses' may not always be used in the narrow sense of "conceptual constituents" and "functions" as I interpret them here.

fundamental concepts of MPL.[2] For the first three sentences, we may also observe that each corresponds to a sentence type that can be distinguished by certain linguistic characteristics. There should be no difficulty in identifying existential statements in modern English. They may be expressed by sentences containing the verb 'exist' or alternatively, the constituent 'there' functions idiomatically as the grammatical subject of sentences of the form [there + be + indefinite NP]. An indefinite NP is a noun specified by an indefinite article or quantifier. To distinguish between the sentences expressing predicative statements (e.g., (b)) and identity statements (e.g., (c)), the linguistic criteria are more complex. For example, (b), which expresses a predicative statement, contains an AP which functions as the predicate complement, but a predicative sentence could as well contain an indefinite NP in the predicate. To illustrate, the sentence 'Scott is an author' also expresses a predicative statement.[3] By way of contrast, (c), which expresses an identity statement, is said to contain only "proper names" as defined by Frege (1892). A proper name is the name of a "particular" (in the ordinary sense of the term 'proper name' (which is usually capitalized in written English) or a definite description (which is a singular general NP containing a definite article). Another linguistic criterion for sentences expressing identity statements is that the phrases that function as the subject and the object of the verb are freely permutable. Both 2 (a) and (b) are sayable

2 (a) The author of *Waverley* is Scott

(b) Scott is the author of *Waverley*

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[2]The existential 'be' is often glossed roughly as "exists" and is symbolized by the existential quantifier in MPL. The attributive or predicative 'be' is not represented distinctly in MPL representations of predications. Fx is read as "x is an F" or "x has the property F." The equative 'be' is glossed as either "be the same as" or 'be identical to" and is represented in MPL by the sign '=' as in "a = a" or "a = b," e.g., Frege (1892).

[3]This analysis is probably the most common one, but it is not the only one available. E.g., Russell (1920: 172) would analyze all sentences of the form [NP be NP] as identity statements. However, a sentence whose predicate complement is an indefinite NP is analyzed by Russell as an ambiguous identity statement. His analysis will be discussed further in 4.2.2.

Both sentences are grammatical and acceptable. They are taken to be logically equivalent, expressing the very same truth conditions. That is, if one is true, then so is the other. But sentences of the following types are less common, though not impossible, in English

3 (a) White is snow (?)

(b) An author is Scott (?)

These facts have led many linguists and logicians to analyze the verb 'be' in (b) and the verb 'be' in (c) as two different verbs. (See, e.g., Halliday 1969: 66-71; Lyons 1977: 469-473, for discussions of these linguistic criteria.) To be sure, it is precisely "these two entirely different ideas" (i.e., *predication* and *identity*) that Russell refers to in the quotation above. In sentence (b) the 'be' of predication would be analyzed as a copula or "linking verb," i.e., [be + AP/NP] would be analyzed as a monadic (one-place) predicate. For identity as in (c), 'be' alone would be analyzed as a dyadic (two-place) predicate, relating two NPs that denote the very same entity

In the case of sentence 1 (d), if we take into account only the distinguishing linguistic characteristics, we would have to analyze it as just another example containing the predicative 'be', like (b). Both are sentences of the form [NP be AP]. Theoretically, we might analyze (d) as a "metalinguistic" statement, since the predicate 'is true' apparently applies only to linguistic objects (sentences). More correctly, 'is true' applies to their intensions, i.e., the propositions that are expressed by such sentences. In my view, the most striking feature that distinguishes the particular sentence types illustrated by (b) and (d) is the ontological type of the NPs that function as the subjects. That is, the NP that functions as the subject of (b) 'snow' denotes a concrete substance, whereas the demonstrative pronoun 'that', the NP that functions as the subject of (d), must stand for an abstract entity of a higher order, some proposition or other, since that is the only sort of thing that has the potential to be true or not.[4] I will argue that such an ontological distinction, even though it is

[4]For the 'be' of predication may be used to ascribe all types of properties (concrete or abstract) to all types of entities (concrete or abstract). Thus, 'true' is the part of the predicate 'is true' whose applicability is limited to certain classes of entities such as sentences, propositions, beliefs, assertions, etc. 'Be' or 'being' on its own, I would argue, is just not restricted in this way

valid for the predicate complement, does not have any significance for the semantic analysis of the verb 'be' itself

So far, I have described two or three possible classifications of the "senses" or "uses" of 'be' In this chapter I shall also consider the analysis of the copula in terms of Aristotle's theory of categories, as described in 1 2 2 (ii) These analyses will be discussed in the context of the question How many verbs 'be' are there in modern English? This dissertation purports to answer this question I claim that there is only one lexeme 'be' in English. In general I shall argue that these alternative analyses of 'be' reflect the sense of the whole sentence, rather than that of the lexical item 'be' alone. All of the analyses that I review here attribute to the verb concepts that may be properly contributed by other constituents of the subject and/or predicate complements that occur with 'be' or by the different combinations of these in categorical sentences.

The present chapter is in four parts. First, in 4 1, I will inquire whether 'be' is meaningless, vague or ambiguous, as claimed by various linguists, logicians, and philosophers of language. Of special interest in this section is the question of the linguistic grounds for determining how many lexical items 'be' there are I will also consider alternative analyses which attribute a specific conceptual content to the verb 'be'. In 4.2, I shall compare the analyses of sentences of the form [NP be NP] in terms of the relation of attribution versus the identity relation between entities. I argue here in support of the analysis of 'be' as the relation of attribution. In 4.3, I will challenge the semantic distinction between 'be' V and 'be' Aux based on the notion of *intentionality* as proposed by Williams (1984). Finally, in 4.4, I will sketch an analysis of idiomatic sentences containing 'be' with fixed subjects, e.g., 'there'

4.1 Is 'be' meaningless, vague or ambiguous?

The question that I will examine in this section is: How many lexical entries are required for an adequate semantic analysis of 'be', or, How many lexemes 'be' are there in the lexicon of English? But the question may be further analyzed. If it turns out that 'be' is indeed ambiguous, then it will be necessary to state the relationship between various multiple lexical entries that are required or

between the parts of a single lexical entry, i.e., in terms of homonymy or polysemy If 'be' were homonymous, then there would be a series of lexical entries, each having a distinct conceptual analysis and presumably the different senses of 'be' would not be related to each other On the other hand, if 'be' were polysemous, then one conceptual analysis of 'be' would permit various semantic interpretations that could be related to each other in systematic ways Or various related senses might apply simultaneously in some cases (See Kempson 1977· ch 8, Lyons 1977 ch 13 4 These linguists argue for the maximization of homonymy and the maximization of polysemy in the lexicon, respectively.)

In this section I shall attempt to demonstrate that the verb 'be' in English is not obviously homonymous or polysemous The idea that 'be' is polysemous seems more plausible a priori than the contrasting ideas that it is either homonymous or meaningless As it is, polysemy seemingly abounds in the lexicons of natural languages, as least this idea is generally promoted by linguists and philosophers of language Lyons (1977 567), e.g., argues that clear instances of polysemy are far more numerous in English than instances of "absolute homonymy." He explains that

> polysemy—the product of metaphorical activity—is essential to the functioning of languages as flexible and efficient semiotic systems. Homonymy .. is not.[5]

My arguments in this section, as far as they go, will be based on an account of what I would take lexical homonymy and polysemy to be in a generative grammar. The relevant question seems to be: How many lexical entries are required to account adequately (in the first instance) for the verb 'be' in the sentence grammar of English? If a single lexical entry represents one sound-meaning correlation, and assuming my morphosyntactic analysis of 'be' presented in Chapter 2, then the only part of the question that remains unanswered concerns its meaning. The issue of homonymy versus polysemy arises only in case the set of phonological sequences representing the verb 'be' is assigned more than one conceptual analysis. Restated in the terminology of my analysis, the traditional distinction between homonymy and polysemy is based upon whether or not distinct senses of 'be' are related: if not, then the relationship is that of homonymy; if so, then polysemy. (See, e.g, Crystal

[5]Weinreich (1972) also views polysemy as the result of meaning transfer or the extension of meaning.

(1980) But, as far as I know, it has not been established for certain that there are indeed different concepts associated with the verb 'be', much less whether or not these would be related to each other, and if so, in what way they are related

The investigation will proceed as follows First, I will try to dispel the hypotheses that conflict with the one-lexeme analysis that I have proposed in Chapters 2 and 3 of this work. I will therefore attempt to refute any hypotheses that assume the existence of several distinct or related senses of 'be'. In this section, I will investigate the conceptual content of 'be', reflecting on the following questions Is 'be' homonymous? (4 1 1) Is 'be' meaningless? (4 1 2) and Is 'be' polysemous? (4 1 3)

4.1.1 Is 'be' homonymous?

The first hypothesis that I shall call into question is the analysis of 'be' in its different "senses" or "uses" as a series of homonyms Homonymy requires that two or more lexical items which just happen to have the same phonological form be assigned distinct intensions. Recall that homonyms are unrelated to each other semantically or etymologically, although etymology is not considered to be relevant for synchronic linguistic analysis Suppose for the sake of argument, that the verb 'be' were analyzed as several different homonymous lexemes: e.g., 'be'$_1$ ("existential"), 'be'$_2$ ("predicative"), 'be'$_3$ ("equative")' 'be'$_4$ ("veridical") These "uses" are illustrated by the following sentences

1 (a) There is indeed a Santa Claus.

(b) Snow is white.

(c) Scott is the author of *Waverley*

(d) That is true.

Now if one postulates more than one distinct lexeme 'be' in the lexicon of English, then supposedly one should present solid linguistic evidence for the different lexemes. If there were indeed several 'be's, then a competent speaker must be able to identify a particular token of 'be' as a member of one class or another. And one lexeme rather than another must not be selected for a given context. If this happens,

the sentence should be not only ungrammatical but also semantically unacceptable. If different morphological forms existed for certain uses of 'be', then one might have a case for the existence of separate lexemes. Since there is only one set of forms for 'be' in English, the homonymy hypothesis is clearly a possibility. In this case, the phonological evidence for a single lexeme would be merely coincidental.

Turning now to the semantic question, the main problem to notice is that the standard methods of distinguishing multiple intensions of lexical items seem to apply aptly to categorematic expressions, but not necessarily to syncategorematic ones. To illustrate this methodological problem, I will consider a pair of lexical homonyms (categoremata) that would be taken uncontroversially as the source of lexical ambiguity in sentences, consider e.g., the nouns 'bat'$_1$ and 'bat'$_2$. If one says

2 (a) There is a bat in the attic.

there are two different linguistic inferences that are possible. One can definitely infer either 2 (b) or (c).

2 (b) There is an animal/mammal in the attic, or

(c) There is a piece of sports equipment/a club in the attic.

These two distinct consequences are clearly attributable to there being two distinct intensions (and hence extensions) of the homonymous noun 'bat'. In contrast, it is not so clear that any implications are derivable from the verb 'be' alone. For predicates such as 'is white', 'is an animal', it is necessary to isolate 'be' from the categorematic complements, 'white' and 'animal'. Then one might ask: is it possible to say decisively whether the following sentences, e.g., whose utterance is interrupted, would contain an existential, a predicative, an equative or a veridical 'be'?

3 (a) It is ___

(b) It's ___

As a matter of fact, these sentence frames could be completed by any XP, and the pronominal that functions as the subject of these incomplete sentences 'it' could be used to refer to anything or to nothing at all, as in the sentence 'It's snowing'.[6] The point is that homonyms should at least have discrete unrelated senses. Given this requirement, the only conclusion here that is evident to me is that the different tokens of the verb 'be' used in the sentences in 1 above should not be analyzed as a series of homonyms. On the homonymy analysis, any token of 'be' would be interpreted exclusively as either existential, predicative, equative, or veridical.[7] Since the different tokens of 'be' do not yield different inferences to support any specific semantic content, they are not obviously homonymous. Rather, I would argue that the specific interpretations would depend upon the semantic classes of the subject and predicate terms. If so, the verb 'be', itself is not specified for any of these properties, although it does not seem unreasonable to select one of these, e.g., the predicative use, as basic.

The tests that have been proposed by linguists and philosophers of language for determining whether a word has more than one distinct sense are not sensitive to theoretical refinements such as homonymy and polysemy. Moreover, these tests are designed to distinguish different meanings of categorematic expressions rather than those of syncategorematic ones such as 'be' For example, Quine's truth functional test applies to general terms, such as 'warm' in the following sentence.

4 This dress is warm.

The test for ambiguity is outlined as follows. A lexical item is ambiguous if and only if from utterance to utterance it "can be clearly true and clearly false of one and the same thing." (Quine 1960: 131). As this test indicates, 'warm' is clearly a multivocal adjective, since it can contribute two different sets of truth conditions. That is, sentence 4 containing 'warm' expresses two different propositions which could be alternately true and false of the same object. The dress itself could be physically warm

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[6]This demonstration is, of course, inconclusive. A counterexample (from Martin Tweedale, personal communication) is an incomplete sentence containing an undeniably ambiguous verb 'banking'. Sentences containing this verb could be completed as follows: 'He is banking his cheque/ his plane/ his pond, etc.

[7]It is assumed here for the sake of the argument that 'be' is homonymous. If one assumed my hypothesis, then 'be' would be univocally predicative, even in the incomplete sentences in 3.

(or not) e.g., if placed on a radiator or in the sun, and still have (or not have) the potential to keep its wearer physically warm. Suppose that we wished to submit the verb 'be' to this truth functional test, appealing to speakers' judgments about the truth conditions of sentences containing 'be' To test for multiple senses of 'be' in a sentence, we would have to keep the intensions (and extensions) of the subject and predicate terms constant, while searching for alternate readings of the sentence with the opposite truth values. Consider the following sentences.

5 (a) A piano is/is not a keyboard instrument

(b) This is/isn't true; that is/isn't false.

(c) The morning star is/is not the same as the evening star

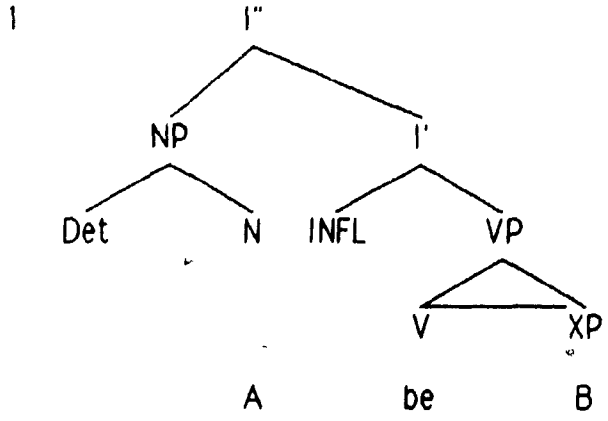
(d) The recipe is/is not in the file

If 'is' in any of the sentences in 5 had multiple senses such that, for a fixed context, on one reading of a sentence, it could be true, while on another reading, it could be false, then what could the different senses of 'is' be? The only contrast that would yield opposite truth values for the sentences in 5 is the contrast between 'is' and 'isn't' or 'is not', as illustrated above. The contrast must always be expressed in the same way, whether 'be' is used predicatively, existentially, veridically, or in an identity statement.

It seems clear to me that the aspects of sentence meaning that could be described as existential, equative or veridical must be attributable to the expressions that function as the subjects and predicate complements of the verb, or to the combination of these, but not to 'be' itself. Just as clearly, the sentences in 5 illustrate that the verb 'be' expresses a predicative relation between the subjects and the predicate terms of elementary sentences. I claim that these sentence types represent a claim that the referent of the subject belongs to or does not belong to the type denoted by the predicate complement.

4.1.2 Is 'be' meaningless?

On the basis of speakers' reactions to incomplete sentences containing 'be' (with no predicate complement, for example), one might be tempted to think that 'be' has no conceptual content at all. In fact, this position has been taken by some linguists, though most linguistic research has actually focused on the various grammatical functions of 'be', e.g., auxiliary or copula, rather than on its meaning. According to Lyons (e.g., 1968: 322; 1977: 471), the copula 'be' by itself is "meaningless." From this perspective, 'be' is taken as a grammatical formative or function word in the grammar of English. Analyzed functionally, 'be' is said to serve as a link between the expressions A and B, as illustrated in the following generalized phrase marker.[8]



In a compositional system of semantic analysis, the copula 'be' would be said to take whatever meaning it has only by its connection with the linguistic expression that functions as the predicate complement, dominated by XP and represented by B in 1 above. In sentence grammar, the copula 'be' may be said to effect predication since it can function as the head of the predicate phrase, or if not the head, it can function as the main verb of the predicate phrase. Even though the copula takes predicate complements that may belong to different syntactic categories and to different semantic classes, it is not clear why the semantic analysis of 'be' itself should be thought to vary from one sentence type to

[8]Sommers (1973; 1983: 184) describes the copula 'be' as " a syncategorematic expression which joins two categoremata," i.e., the subject and the predicate terms (A and B, respectively as illustrated in 1 above). But analyzing 'be' as a syncategorematic expression does not necessitate considering it to be meaningless.

the next Effectively, arguing that it does vary thus in meaning should not carry much force, since the copula itself is considered on this view to be meaningless in the first place [9]

To be precise, it is perhaps more correct to say, as Crystal (1980 93) does, that 'be' "has little independent MEANING," rather than that it is "meaningless" The idea that it is meaningless can be verified by comparing sentences containing 'be' with sentences containing other verbs that could be substituted for 'be' The technique of substituting expressions of the same syntactic category is based on the notion of a *minimal pair* For sentence meaning, the procedure is to compare pairs of sentences in which only one word is different to see what, if any, difference there is in meaning. The difference may presumably be properly attributed to the intensions of the different verbs that are intersubstitutable Compare the following pairs of sentences containing different verbs and 'be', respectively

2 (a) John seems tired
(b) John is tired

3 (a) John hit a tall man
(b) John is a tall man

4 (a) John went somewhere
(b) John was somewhere.

5 (a) John stayed in a good mood
(b) John was in a good mood

For all of these pairs of sentences in 2-5, both the (a) and (b) sentences may be used to make assertions that are equally acceptable If 'be' is indeed "meaningless, then it seems that whatever contribution is made by the verbs 'seem', 'hit', 'go', and 'stay' contrasts with a blank. But how can these verbs contrast with an "empty" verb? Furthermore, in the case of the sentences in 4 and 5, there is an inferential relation between the sentence pairs, the (b) sentences containing 'be' follow from the (a) sentences for some time (unspecified here) Even though a conceptual content has not

[9] I assume that all of those (linguists) who assume that 'be' is a meaningless grammatical formative would also treat it as a single lexical item. Bach (1967) and Lyons (1977) analyze the copula as an element of surface structure only. It is said not to appear in the deep structure of categorical sentences.

been postulated for any of these verbs, since they contrast with 'be', clearly 'be' itself is not a completely meaningless lexeme

To support their claim, linguists who deny that 'be' is meaningful say that it is required in categorical sentences only to fill the position of the verb which is obligatory in English, in order to carry the markers of tense, aspect, person and/or number It is arguable, however, that 'be' does have a sense which is actually distinct from any particular tense or aspect Some evidence for an independent sense of 'be' is the fact that speakers also find a use for its base infinitive and other non-finite forms Of course, since all forms of 'be', and other verbs, also express tense or aspect, these are also emphasized at the same time as the relation of attribution The non-finite forms are stressed in the following sentences, in which various aspects are being stressed

6 (a) John has been being insincere

(b) He was to be (the) king/there

(c) He was to have been (the) king

(d) Bill was being assaulted

(e) The students have been questioned

In addition, whatever is expressed by the base verb 'be may be modified by different modalities (expressed by 'can', 'will', 'must', etc) and it may be questioned or denied, just as what is expressed by other verbs may be modified, questioned or denied. Furthermore, whatever is expressed by 'be' (I claim that it is the attribution of a type to the referent(s) of the subject) may be emphasized in utterances, by placing the stress on the verb, as indicated in the sentences in 8 below Here 'be' and 'seem' are compared and contrasted

7 (a) John seems tired.

(b) John may seem tired.

(c) Does John seem tired?

(d) John does not seem tired.

8 (a) John is tired

(b) John may be tired, although he doesn't look it

(c) Is John tired? Really?

(d) John isn't tired.

Emphatic stress is indicated here by underlining. Notice that stress falls naturally on the verb 'be'. I would argue that it is the relation of attribution (or the predication of a type) that is being emphasized, modified, questioned or denied in the utterance of these sentences in 8. The relation of attribution or 'be' is stressed in 8 (b), where it is contrasted with the verb 'look'. It simply would not make sense for speakers to stress an empty "meaningless" verb. In fact, one does not stress "dummy" constituents, such as existential 'there' or 'it' in 'There is a Santa Claus' or 'It is raining'.

Finally, it is possible to describe some general semantic properties of sentences containing the verb 'be' in all its forms. For instance, it seems that sentences containing 'be' denote states of affairs, rather than events. As Gruber (1976) and Jackendoff (1976, e.g.) argue and illustrate, sentences containing 'be' may be modified by point of time or period adverbs, but not by frequency adverbs. Even when sentences containing 'be' meet the structural description for the so-called "passive transformation," i.e., [NP V NP], such sentences do not passivize. Yet all passive sentences contain the lexeme 'be' or the so-called "passive" auxiliary. Although not all sentences containing 'be' are passive, it seems that non-passive sentences containing 'be' could not be correctly characterized as "active" either. In general, then all sentences containing 'be', seem to share the semantic feature of stativity, or "momentariness", as Gruber describes it.[10] Clearly the verb 'be' cannot be meaningless.

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[10] Some linguists have observed that sentences containing almost any verb other than 'be' may be "transformed" into sentences that use 'be' either as a passive or as a progressive auxiliary. This fact may be one basis for TFL claims that all sentences of natural language are paraphraseable as categorical sentences containing 'be'. (See, e.g, Sommers 1982: 167-168.) These facts may be significant for the issue of the effability of English. In general, it seems that most verbs have active forms, e.g., the progressive, and stative forms, e.g., the passive. As a consequence, speakers may describe events or states of affairs under different aspects by using constructions with either active or stative verbs.

4.1.3 Is 'be' polysemous?

I have tried on the one hand to argue that the lexeme 'be' does not have a multitude of distinct senses, but on the other hand, that it is not completely meaningless either. Now the question is: if 'be' were correctly analyzed as a single lexeme, could it be polysemous? If so, 'be' would be described in a single lexical entry with several related senses. A polysemous lexical entry would permit the semantic contribution of 'be' in different sentence types to vary from each other, the different senses being related to each other in predictable ways. The application of the notion of *polysemy* seems destined however to encounter problems so far unresolved in the analysis of the conceptual content of lexical items. One problem is that relatedness in meaning is a "matter of degree," as Lyons suggests. In his discussion of the notions of *homonymy* and *polysemy* (Lyons 1977. 550-569), he states that in tests, speakers exhibit a pretheoretical indeterminacy in their judgments about relatedness of meaning. Although the thesis that I wish to advance here is that 'be' can be analyzed as a single lexeme on semantic grounds, it may indeed prove difficult, if not impossible, to show that it is not polysemous, in the sense that its interpretation seems to vary from one context to the other. I shall now consider two polysemous analyses of 'be', Aristotle's ten-way analysis based on his theory of categories, and the four-way analysis described in 4.1 above.

Aristotle's categorical analysis. Aristotle's analysis of 'einai' in ancient Greek suggests that he considered it to be polysemous. In discussing the question of the ambiguity of words, Aristotle, in *Categories* and *Topics*, for example, provides several tests for determining how many meanings a particular word has. In the case of a verb such as 'be', he suggests, among other things, that if it can be used with terms that belong to different ontological categories, then it is ambiguous. In fact, Aristotle says (in *Metaphysics* 5, 7) that 'being' has as many *per se* ("essential") senses as there are categories. As is well-known, Aristotle's categories number ten. If his principle is valid, then 'be' has at least ten different "senses," as distinguished by the categories. (See 1.2.2 (ii) for a brief introduction to the categories of Aristotle.) The following sentences may illustrate "essential" predications representing each of the categories.

1 (a) This animal is a horse. (substance; essence)

(b) This colour is white, which is a quality.

(c) The width is three metres, which is a quantity.

(d) This city is Copenhagen, which is a place

(e) Summer is my favourite season of the year (time)

(f) This man is his teacher. (relation)

(g) Standing and lying are contrasting positions.

(h) He's bankrupt; that's his financial state (condition)

(i) Fighting was what he was doing. (activity)

(j) He was being assaulted; that's what was happening to him (passivity)

But the verb 'einai' is said to have other "senses" as well, e.g., those involved in so-called "accidental" predication and the "veridical " Aristotle further distinguishes the "potential" and the "actual" senses of the copula, an ambiguity that he ascribes to all verbs Moreover, he then identifies four "means of making propositions," i e., of combining subjects and predicate terms in propositions. These topics are reviewed in 1.2.2 (ii)

Although Aristotle's (theory of) categories may have begun as an ontological inquiry (as Ackrill suggests in his notes on Aristotle's *Categories* and *De Interpretatione* ... 1963. 71), his works nevertheless have considerable linguistic interest. Aristotle seems to have based his theory on a systematic examination of various types of sentences containing the verb 'be' (or rather its equivalent in ancient Greek). His analysis results in a (possibly) valid and useful classification of different types (or genera) of subject and predicate terms. Furthermore, his hypothesis concerning the ambiguity of the verb 'be' contains very interesting claims that should be tested. But given his observations, one can draw different conclusions concerning the verb 'be'. Aristotle argues that because each of the subject and predicate terms, such as those in 1 above, belongs to a different category, since 'be' can be employed with all of them, then the copula must be equivocal. But I find that these observations provide equally strong support for a univocal analysis.

It is important to notice that Aristotle does not claim that 'einai' has an indeterminately large number of different "senses." Rather, he very carefully discriminates among a finite set of different "senses" that are possible. I will focus on those that are related systematically to the different categories of the subject and predicate terms that occur with 'be' in sentences. Clearly Aristotle shows great ingenuity by calling attention to the categories of the subject and predicate terms. But it may be a mistake in this connection (in fact, I think it is a mistake) to talk about the different "senses" of the verb.[11] Perhaps in the case of 'be' (or other general verbs, for that matter), Aristotle's fundamental principle for determining ambiguity is mistaken: viz, if a verb is used with expressions that belong to different categories, the verb itself is equivocal. Aristotle has stated precisely how the subject and predicate terms vary in propositions, but not what the content of the different uses of 'be' would be. One might argue that Aristotle has not in fact demonstrated that 'being' is not univocally predicable of all the entities in the different categories. Indeed, it seems that he has demonstrated just the opposite, that 'being' *per se* is attributable to a wide range of different entities, and likewise, for 'being' *per accidens*. Kahn (1973: 6, n. 11) makes the following point.

> Strictly speaking, for Aristotle, it is not the word *being* which has a systematic diversity of meanings, but rather *things* of different kinds and different orders which are said to be (are called "beings") in different ways, by reference to one fundamental kind of being, that of substances.[12]

I take it for granted that different semantic relations may hold between the "substances" denoted by the subject NPs and the predicate expressions that belong to a variety of different categories (perhaps precisely as classified by Aristotle.) But in the categorical sentences, the lexeme 'be' is the only constituent that is invariable; all of the sentences in 1 above have the verb 'be' in common. It seems a mistake to attribute semantic diversity to the only constituent that is always the same in these

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[11] It is possible that Aristotle is led into this terminology and the corresponding analysis by the contemporary parlance of the Academy. Plato, for instance, would probably not have agreed with Aristotle that '*einai*' was equivocal. To be consistent, Plato would have been disposed to search for a single definition of Being (or a Form of Being) which could be predicated of all things univocally (Sommers 1965: 262). In order to criticize or to question this position, it would seem most natural to argue that the copula is equivocal or has many "senses," rather than a single definition.

[12] Here Kahn refers to Aristotle's doctrine of "focal meaning" or ambiguity *pros hen*, which he says is "a theory of the semantic status of certain terms that represent neither synonyms or homonyms ... but a plurality of uses and senses that are unified by reference to a single base."

sentence types. In other words, clearly the possibility of expressing various semantic relations in different categorical sentences in no way necessitates that the verb 'be' have different lexical entries (either homonymous or polysemous). Rather we should probably expect that the linguistic expressions that are different in the sentences would determine the differences in their interpretations. Thus, it seems that Aristotle's observations have more linguistic significance for the semantic description of subject NPs and the phrases that function as the complements of 'be' than for the semantic description of 'be' itself. This conclusion would do no harm to Aristotle's theory of categories. Furthermore, it seems to me that he could consistently maintain his fundamental theory of the categories and, at the same time, admit that there is some conceptual unity underlying his proposed ontological system of being, as well as the corresponding verb. This seems to be a logical conclusion of Aristotle's own analysis, if I have interpreted it correctly

Four-way analysis of 'be'. The analysis of elementary sentences containing 'be' within MPL, following Russell, e.g., in effect also suggests polysemy, rather than homonymy, despite his claims concerning its very different meanings.

2 (a) There is indeed a Santa Claus.
Indeed $(\exists x)(Sx)$, where 'S' stands for "is a Santa Claus"

(b) The present king of France is bald.[13]
$\exists x (F(x) \& G(x) \& \sim \exists y (F(y) \& x = y))$, where 'F' stands for "is the King of France" and 'G' for "is bald"

(c) Scott is the author of *Waverley*.
S=W, where 'S' stands for "Scott" and 'W' for "the author of *Waverley* "

(d) That is true.
T (p), where 'p' stands for "a contextually defined proposition" and 'T' for "is true"

The representation of these sentences in the symbolic notation of MPL often combines several symbols each of which stands for a distinct concept. For example, 2 (b) combines symbols which stand for "entirely different ideas," as Russell says. But what is the linguistic evidence for the "sameness" or

[13]The sentence may be paraphrased as: 'There is one and only one king of France and he is bald'. This is represented symbolically in 2 (b) above.

"difference" of the senses of the 'be' that occur in the different sentence types above? To verify the contributions of verbs to sentence meaning, Alston (1971) employs a test of "partial substitution" of synonymous verbs [14] This is another technique based on the notion of a *minimal pair*. But there are several difficulties in applying this test to sentences containing 'be' The most crucial is that in English there seem to be no other verbs that are completely synonymous with 'be' Besides being synonymous, another necessary condition for the substitution of verbs is that their strict subcategorization frames be identical The problem can be illustrated with the following set of sentences.

3 (a) There exists indeed a Santa Claus

(b) The present king of France exists bald (*)

(c) Scott exists the author of *Waverley* (*)

(d) That exits true (*)

'Be' in the sentence frame [There is/are ___] is often glossed as "exists." As it is used in 2 (a), we might consider the verb 'exist' to be synonymous with 'be'. And indeed it is possible to substitute 'exist' for 'be' in 2 (a), the result being also a grammatical sentence 3 (a), which is moreover semantically acceptable. It seems, furthermore, that sentences 2 (a) and 3 (a) have the same truth conditions. But it is not possible to replace the verb 'be' with 'exist' in the other sentences of 2 This may be so not only because the contribution that 'be' makes to the proposition expressed by 2 (a) is different from its contribution to the one expressed in 2 (b)-(d), but also it may be so for syntactic reasons. As it happens, 'exist' is a verb that can be inserted grammatically into the context that

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[14] For example, in the following sentences from Alston (1971: 38-40),

(i) The boundary ran from this tree to that tree.

(ii) John ran from this tree to that tree.

for 'run', we could try to substitute the verb 'extend'.

(iii) The boundary extended from this tree to that tree.

(iv) John extended from this tree to that tree. (?)

For this set of sentences, Alston asks whether "the verbs make the same contribution to the meaning of the ... sentences." He concludes that since (i) and (iii) have the same meaning, while (ii) and (iv) do not, the sense that the verb 'run' contributes to (i) is the same as the sense that 'extend' contributes to (iii) but differs from 'run' in (ii).

requires an intransitive verb. Among the sentences in 2, only (a) furnishes such a context Sentences 3 (b)-(d) are all ungrammatical then because they fail to meet the strict subcategorization requirements of an intransitive verb such as 'exist' The sentence frame [There + be ___] has only one position, the predicate complement position, that takes a denoting expression of the category NP, which must be indefinite (For a tentative analysis of sentences containing 'there' and 'be', see 4 4)

Another problem in applying the test of "partial substitution" of synonymous verbs is the possible ambiguity of 'exist' (or of any other verb whose sense is compared with the test verb's) Obviously the substitution of 'exist' for 'be' might be seen to provide inconclusive evidence for the "sameness" of meaning in various sentences if the interpretation of 'exist' varies from one sentence to the next. Consider the following sentence types

4 (a) There is/exists no such thing as a unicorn

(b) There is/exists a God/only one true God.

(c) There was/existed an old woman who lived in a shoe

(d) There are/exist brave people who openly oppose war

It seems clear that even if 'being' and 'existing' were synonymous expressions, they are not restricted to designating just one kind of being or one kind of existing, respectively. And for these sentences, in any case, both 'be' and 'exist' seem to range over the same classes of entities that are denoted by NPs.

To conclude, in this section I have reviewed two well-known philosophical classifications of the different "senses" or "uses" of the verb 'be': the ten-way distinction based on the categories of Aristotle, and the four-way distinction among the existential, predicative, equative, and veridical contexts. In my view, it would be clearly wrong to assign multiple senses, characterized as, e.g., "existential," "predicative," "equative," and "veridical" to a syncategorematic expression such as 'be'. In any case, since 'be' has so "little independent MEANING" as Crystal (1980: 93) says, it would seem difficult to go about showing that the verb itself is associated with distinct senses in different contexts. But what is it that in fact establishes an "existential" as opposed to an "equative" or a "predicative" context? My answer is that it is surely not the syncategorematic verb 'be', but rather the

expressions that occur with 'be' in categorical sentences. Both of the classifications reviewed above reflect an analysis of the sense of whole sentences containing 'be', rather than the sense of the lexical item 'be' alone I have criticized both of these approaches to the semantic analysis of 'be' for attributing to the verb concepts that are properly contributed by the subject and /or predicate terms to the sense of the sentence or by the combination of subject and predicate phrases, rather than by the verb 'be' itself.

In any case, the lexical analysis of the verb 'be' that I propose involves neither homonymy nor polysemy 'Be' is assigned a single lexical entry and is described as a single lexeme, which represents only one sound-meaning correlation

4.2 Conceptual analysis of 'be' as type attribution or as the identity relation

My purpose in this section is to justify the semantic analysis of 'be' that I proposed in Chapter 3 and to debunk the identity analysis. I claim that the syncategorematic verb 'be' explicitly expresses the attribution of an ontological type or types to the referent(s) of the subject NP, which is an entity, some or no entities of a certain type or a type of entity itself. In this section I shall argue that the same analysis applies naturally to the sentences that are analyzed within MPL as identity statements. The data to be considered are limited to sentences of the form [NP be NP] as these are the only ones which could be analyzed as identity statements. Consider the following sentences.

1 (a) Scott is the author of Waverley (s = W)

(b) Scott is an author. (As)

For these sentences analyzed within MPL, two different concepts would be ascribed to the verb 'is'. It would be analyzed as "equative" in (a) and as "predicative" in (b). These concepts would be symbolized in MPL as 's=W' and 'As' respectively. Here 's' stands for "Scott" and 'W' stands for "the author of Waverley" and 'A' stands for "is an author " It is debatable however, as to exactly which concepts should be attributed to the verb itself. As I suggested in section 4.1, the different interpretations of these sentences would depend upon the semantic classes of the terms that occur with 'be'. Thus, it is

possible that the verb itself is not specified for either of these functions; instead, the aspects of sentence meaning that could be described as equative or predicative might be attributable to the expressions that function as the subjects and predicate complements of the verb, or to the different combinations of these, but not to the verb itself.

Now since I have argued in the previous section that 'be' is not meaningless, I must assume that it has a conceptual content. I claim, in fact, that 'be' is univocal. If this is so, then the sense of the verb should always be the same, or at least it would be the same in the unmarked cases. In 4.1, I considered a well known four-way logical classification of the "uses" of 'be': the "existential," "predicative," "equative," and "veridical." Since I would analyze the "existential" reading as idiomatic (see 4.4) and the "veridical" to be a special case of the "predicative" reading, only two of the four "uses" of 'be' remain as possible candidates for the conceptual analysis of the verb. These are the 'be' of "identity" and the 'be' of "predication." Of these two analyses, it is often claimed that the predicative one is the more basic, fundamental or primitive (e.g., Kahn 1973; 1973a). Similarly, I have proposed a single rule of interpretation for all elementary sentences containing 'be', but it is based on the notion of the attribution of ontological types to entities, or conversely, of entities' belonging to certain ontological types.

In this section I will compare and contrast the analyses of categorical sentences containing 'be' in terms of the notions of *attribution* and *identity*. The question concerns the concepts corresponding to the 'be' of predication and the 'be' of identity. My purpose is to demonstrate that the analysis to 'be' in terms of the attribution of types can serve better than the analysis of 'be' in terms of identity as a basis for a single rule of semantic interpretation for all sentences containing 'be' in the context [NP____XP]. I will offer three kinds of arguments in support of this claim.

4.2.1 Logical properties of identity

The first set of arguments concerns the intrinsic (logical) properties of the identity relation The relation of identity, as it is described in MPL, is reflexive, transitive and symmetrical.

Debating the question "Do we need identity?" Sommers (1982: ch. 6) rejects the notion of *identity* as a dyadic relation. In order to appreciate his position, we need of course to ask what it is that identity is or is not needed for. Sommers' purpose is to show that statements of identity can be viewed logically as monadic categorical propositions. To this end, he provides proofs for the monadic counterparts of the standard identity principles of MPL. He claims that identity as a special binary relation is redundant; that is, it can be taken as a special case of predication as analyzed within TFL. Sommers claims that identity (for individuals) can be defined as a special case of 'a is b', the case where 'a is b' and 'b is a' are both true.[1] Sommers (1982: 122) writes:

> One law of identity is that the identity relation is reflexive. The monadic counterpart of this is that '*a is a' is a logical truth. That this is so is evident if we give it the form of a universal proposition. . . Then '*a is a' is an instance of 'every x is x' which is a logical truth in traditional logic. (It is known as *the* law of identity.)[2]

Thus, it is shown that identity, even when it is taken predicatively, is still reflexive. This is so because the sentence 'All a is a' is a tautology. Sommers goes on the demonstrate that it is also symmetrical and transitive. Identity, taken predicatively, is symmetrical since the sentences 'Some a is b' and 'Some b is a' are equivalent in TFL. Identity, taken as the subject-predicate relation, is also transitive. This is proven by the following statement: 'All a is b, all b is c, therefore all a is c', which is a valid syllogism (Sommers 1982: 123-124). For Sommers' programme, which is to develop a logical calculus based on the standard categorical form, he has demonstrated in its favour the possibility of representing the necessary properties of the identity relation as described within MPL without the need for special axioms or a special symbol for identity such as '='.

On the basis of the intrinsic properties of the two relations, it might seem possible, by purely logical argument, to devastate the identity hypothesis, i.e., for the analysis of 'be' used in all

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[1] According to Kahn (1973: 5), a similar claim is made by the Polish logician Leśniewski. Kahn says that Leśniewski takes the epsilon relation as primitive.

[2] '*' in '*a is a' must be read as "wild quantity" which is either universal or particular. See footnote 4, 1.2.1.

types of categorical sentences in English.[3] While all identity statements may be expressed in standard categorical form, presumably the reverse is not possible. Even though symbolically, representations of the relation of identity are shown to be reducible to or equivalent to representations of the relation of predication, it has still not been shown that the notion of identity is not appropriate for the semantic analysis of certain sentence types, namely, the kind that are said to express identity statements according to the MPL analysis.

1 (a) Scott is Scott

(b) Scott is the author of *Waverley*

These sentences are of the types that Frege (1892) represents as "a=a" and "a=b," in which the 'be' of identity is considered to express a dyadic relation. 'Be' is used in (a), it is said, to assert the identity of an individual named 'Scott' and an individual name 'Scott'. In (b), 'be' is used, it is said, to assert the identity of an individual named 'Scott' and an individual described as 'the author of *Waverley*'. But Sommers would claim that only 1 (a) is an instance of the law of identity. If identity statements are taken to exemplify this law of identity, which is more restricted, then it follows that 1 (b) is not an identity statement at all. Sentences that express true identity statements in this narrow sense of identity are perhaps rarely if ever uttered in natural language. For genuine identity, the terms 'a' and 'b' should be equivalent both intensionally and extensionally. The terms in sentence 1 (a), but not 1 (b), would meet these conditions. In this perspective, it is surely questionable that all occurrences of 'be' in sentences of the form [NP be NP] should be analyzed conceptually in terms of the notion of *identity*.

In any discussion of the notion of *identity* a continuing problem is to determine explicitly what it is that is supposed to be identical. In a linguistic analysis, there are three possibilities: it might be expressions, intensions, or extensions. Sentence 1 (a), but not 1 (b), contains two tokens of the same

[3] As Sommers has shown, the properties of the identity relation may be formally defined both in MPL and in TFL. In MPL, transitivity is defined as $(x)(y)(z)\{(x=y)\cdot(y=z)\rightarrow(x=z)\}$, symmetry is defined as $(x)(y)\{(x=y)\rightarrow(y=x)\}$, and reflexivity is defined as $(x)(x=x)$ (Copi 1973: 136). In my analysis, the intrinsic properties of the relation expressed by 'be + F' would crucially depend upon the value of the predicate variable F.

expressions, intensions, or extensions. Sentence 1 (a), but not 1 (b), contains two tokens of the same expression 'Scott'. Within MPL, Russell, e.g., explicitly denies that 1 (b) above asserts that "'Scott' and 'the author of Waverley' are two names for the same object." (Whitehead and Russell 1910: 70; my emphasis). Against the MPL analysis, it seems to me that Sommers likewise presents his strongest arguments in objecting to the definition of *identity* as a dyadic relation between things (or the extensions of expressions). He defines an identity proposition as "a monadic proposition that has proper names in *both* subject and predicate positions." (Sommers 1982: 122). He notes that when "identity is thought of as a relation, then the most reasonable thing to say is that it is a relation a thing bears to itself," as Frege does (Sommers 1982: 130). But Sommers rejects the Fregean notion of identity as a dyadic relation; rather he claims, "what makes identity a relation is that '=' goes between distinct occurrences of singular terms and not that it relates distinct objects." He claims furthermore that in TFL, it is "not even coherent to say" that "everything is necessarily identical with itself" since "there is no meaning to a relation of identity between a thing and itself." (Sommers 1982: 133; my emphasis). Here he seems to agree with Wittgenstein (1961: 52, theorems 5.5302-5.5303).

Sommers objects strongly to the analysis of predications expressed as 'a is b' as identity statements. Of course I agree with his objections, but I will not pursue this argument from the viewpoint of symbolic logic. Although the entities denoted by the expressions 'a' and 'b' may be extensionally equivalent, it may be more important to notice how the extensions are determined. The intensions of two categorematic expressions 'a' and 'b' are usually not logically equivalent. This is especially true in the case of expressions that function as the subjects and predicate terms of elementary sentences containing 'be'. In the terminology of my analysis, the types designated by these expressions are almost invariably different.

4.2.2 Linguistic criteria for sentences that express identity statements

Students of language who make a distinction between the 'be' of identity and the 'be' of predication have suggested some linguistic criteria for sentences that are analyzed as identity

statements as opposed to ordinary predications. Russell (1920), for example, seems to be sensitive to syntactic distinctions that correspond to the different functions of constituents in natural language sentences. In his well-known discussion of descriptions (1920: 100), he writes:

> The proposition "Socrates is human" expresses the relation of subject and predicate; the *is* of "Socrates is a man" is identity between an object named and an object ambiguously described. An object ambiguously described will "exist" when at least one such proposition is true, i.e., when there is at least one true proposition of the form "x is a so-and-so," where "x" is a name. It is characteristic of ambiguous (as opposed to definite) descriptions that there may be any number of true propositions of the above form—Socrates is a man, Plato is a man, etc. With definite descriptions, on the other hand, the corresponding form of proposition, namely, "x is the so-and-so" (where "x" is a name), can only be true for one value of x at most.

I wish to examine two of Russell's observations here. First, to rephrase Russell in linguistic terms, we can gather that NPs, but not APs, function as the predicate complements of sentences that express identity statements. AP complements occur only with the 'be' of predication. As far as they go, these observations are surely correct. Determining that the syntactic category of the constituent that functions as the complement must be an NP establishes only a necessary but not a sufficient condition for identity statements. In order to substantiate this, I want to call attention to another of Russell's observations. Here I will examine the claim that the referent of a (singular) definite description must be unique. It is Russell's "uniqueness" claim that I would like to try to refute. (Here I will ignore his further requirement that the unique referent exist. As observed in Chapter 1, the actual referent(s) and its (their) existence are irrelevant for the conceptual analysis of expressions. But for linguistic analysis, type information concerning the potential referents of expressions is important, irrespective of whether they exist or not.)

It is true, as Russell suggests, that only sentences containing NPs in the predicate complement position can express identity statements, but not all sentences containing NPs in this position do indeed express identity. Furthermore, Russell's uniqueness condition would rarely hold for ordinary predications in natural language. It is simply not true in every case that sentences "with definite descriptions, 'x is the so-and-so', can only be true for one value of x at most." It may be true in some cases but by no means all. Consider the following sentences containing a definite description of the form "the so-and-so," as required.

1 (a) Jed is the president of a company

(b) Jed is the president of his company

(c) Jed is the president of a company and so is Bill

(d) Jed is the president of his company and so is Bill

In compound sentences such as 1 (c) and (d), the 'so' of 'and so' is sometimes analyzed as a PRO-VP That is, 'so' replaces the VP of the first sentences, in order to avoid duplication in the second of the two sentences. (Also in the second sentence, there is inversion of the subject NP and the verb) In 1 (a)-(b) the property of being the president of a company is attributed to an individual named 'Jed' In 1 (c), the same property is attributed additionally to a second individual named 'Bill' The fact that it is possible to attribute the same property to another individual seems to indicate that the two NPs in 1 (a)-(b), i e , 'Jed' and 'the president of .' do not denote the same entities Notice that it is the property of being the president of a company (not the property of being the individual that is the president of a company) that is being attributed to the two individuals In 1 (d), assuming that 'his' is coreferential with the subject NP, then one might argue that in this case, different properties are actually being ascribed to the two individuals There is merit in this. Of course, it may be valid in most cases, as Russell claims, that 'x is the so-and-so' can be true of one individual at most. But not when the definite description is such that it is applicable to more than one individual It is usually possible to attribute predicate complement phrases (which always denote types) to more than one individual That is a characteristic of expressions of human language. Consider the following sentences

2 (a) Beth is the teacher's pet

(b) Beth is the teacher's pet and so is Bert

It is clearly false that 'the' always introduces a phrase that can be truly predicated of one individual at most. 'The teacher's pet' could mean either "the pet of a teacher" or "a pet of the teacher," assuming in these glosses that 'the' is unambiguous and 'a' is ambiguous in Russell's sense, meaning "at most one' or 'at least one', respectively. Could it also mean "a pet of a teacher?" If so, then the problem is not

limited to the possible scope of the definite article within the genitive construction, as in the examples in 1 and 2 above. Fundamentally, Russell's analysis of the definite and indefinite articles in English seems questionable for linguistic analysis [4]

As Russell suggests, "unambiguous" identity statements contain only "proper names" and/or definite descriptions. In any case, these NPs must be definite singular expressions which contain no ambiguous determiners or variables (as does 1 (b) above, where 'his' is possibly "coreferential" or not inevitably "disjoint") The linguistic criteria for sentences expressing identity statements may be further refined. For instance, another criterion is that the phrases that function as the subject and the complement of the verb 'be' are freely permutable. But again, some sentences that meet these criteria fail to express identity statements. Below are examples of sentences whose subject and predicate NPs are permutable. The following (a) and (b) sentences in 3-5 are supposed to express the same propositions.

3 (a) Don is my teacher

(b) My teacher is Don

(c) Don is my teacher and so is Mary

(d) My teacher is Don and so is my friend (?)

4 (a) Mary is my best friend.

(b) My best friend is Mary.

(c) My best friend is Mary, not Margaret.

(d) My best friend is Mary and so is my teacher (?)

5 (a) My name is Charles.

(b) Charles is my name.

(c) Charles is my name and so is Robert.

(d) My name is Charles and so is my friend (?)

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[4] From the point of view of a "speech-act" theory of reference, e.g., Searle (1969; 1979), the function of the definite article is said not to imply uniqueness, but rather its use indicates the speaker's intention to refer uniquely.

It seems clear that the two NPs in each of the sentences in 3-5 above, though permutable, do not denote the same entities, or even the same ontological types. As shown in the (c) and (d) sentences of 3-5, the name of a person is predicable of only one person at a time. It is not predicable of another individual at the same time, although a predicate such as 'is my teacher' or 'is my best friend' is.

On the basis of my interpretation of the data presented here, I conclude that *identity* is simply the wrong concept for the conceptual analysis of the verb 'be' even for sentences containing only proper names and/or definite descriptions Even though these sentences have only one referent, I would argue against the "co-referentiality" of the subject and predicate terms. (This idea is implicit in theories of predication by coindexing. See 2.1 1 above.) Rather, there is some linguistic evidence to support the claim that subjects and predicates of categorical sentences that are analyzed as identity statements are conceived differently Although the extensions of all NPs are determined by the same basic principles, invariably the phrase that is governed by the verb 'be' is predicated of the referent of the subject NP For subject, the speaker would focus on the referent, for predicates, on the type denoted. Hence the subject is ultimately analyzed as having an "identifying" function, while the predicate is analyzed as having a "characterizing" function. Extensionally then, the subjects and predicate complements are not conceived in the same way. To illustrate this, I will now examine sentences in which personal and non-personal relative pronominals are used to refer to what is denoted by the subject and predicate NPs In the following sentences, the personal pronouns 'who' and 'whom' are suitable for the referents of the subjects, but not for the predicate complements.

6 (a) Jane is an astronaut, who(m) I admire.

(b) Jane, who(m) I admire, is an astronaut.

(c) Jane is an astronaut, who I want to become (?)

(d) Jane is an astronaut, which I want to become.

(e) Jane is an astronaut, which is who I want to become (?)

(f) Jane is an astronaut, which is what I want to become.

(g) Jane is an astronaut and so is John.

6 (h) Jane is an astronaut and John is one, too.

7 (a) Scott is the author of *Waverley*.

(b) Scott, who you are not, is the author of *Waverley*

(c) Scott is the author of *Waverley*, which you are not

(d) Scott is the author of *Waverley*, who you are not (?)

8 (a) Bill is the president.

(b) The president is Bill.

(c) Bill is the president$_i$ who$_i$ I wanted to be (?)

(d) Bill is the president, which (is what) I wanted to be

This is how I interpret these data Once again, the predicate NP can be predicated of a second individual, as shown in 6 (g) and (h). This second NP is an indefinite description, which, as Russell observes, is "ambiguous." The only plausible conclusion is that the predicate NP designates a property or an ontological type, but not an individual that is identical to the one identified by the subject NP The second kind of evidence for this involves the use of relative pronominals. For the relative pro-NPs 'who', 'which' and 'that' apparently constitute a two-gender system in English. 'Who' and 'which' are essentially personal and non-personal, respectively, while 'that', which is used in restrictive clauses, is either personal or non-personal. 'Who' is used to refer to human beings, while 'which' is used to refer to others, and 'that' may be used to refer to either. (In the test above, I have used only 'who' and 'which'. For more details concerning these pronominals, see Quirk, Greenbaum, Leech and Svartvik 1972: 214-215; Kuno 1970.) Now to discuss the data, it seems that if the sentences above indeed express identity statements, then speakers should be able to use the same pro-NP to replace both subjects and predicate complements. This is impossible, however, as illustrated in 6-8 above. 'Who', but not 'which' may be used to refer to the persons denoted by 'Jane', 'Scott' and 'Bill', respectively. By way of contrast, 'which' and 'what', but not 'who' may be used to refer to whatever the predicate NP designates: an astronaut, the author of *Waverley*, the president. Clearly, being an

astronaut, being the author of *Waverley* and being the president are properties that are ascribable to other individuals besides Jane, Scott and Bill[5] I conclude, therefore, that speakers of English do not conceive of the extensions of the descriptive phrases that function as the predicate complements in the same way as they conceive of the persons named in the subject NPs of sentences such as 6-8 above. The result is the same whether the predicate NP is an indefinite description as in 6 or a definite description as in 7-8, even though for all sentences above, the descriptions expressed by the predicates may be used, if applicable, to refer to the referents of the subjects. It seems that the NPs of most sentences of the form [NP be NP] are equivalent extensionally, but not intensionally Thus I conjecture that there will be few, if any, sentences of this form that contain descriptions that are intended to convey "a=b."

It is even possible that sentences in which two proper names (for the same individual) are combined in fact simply express "the relation of subject and predicate," as Russell describes it, rather than the relation of identity If so, then it is surely questionable that any statements of the form [NP be NP] should be analyzed as identity statements, even when both NPs are proper names, as in the following sentences.

9 (a) Mark Twain is Samuel Longhorn Clemens

(b) Cicero is Tully

(c) Saul is now Paul; Paul was Saul.

(d) Muhammad Ali is Cassius Clay.

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[5]This should not be taken to imply that descriptions may not be used to refer to individuals but only to designate properties or classes. On the contrary, the same descriptions that function as the predicate complements in 6-8 may also function as the subject of sentences.

(i) An astronaut, who (*which) is wearing a space suit, is here.

(ii) The author of *Mad*, who (*which) autographed my book, is here.

(iii) The president, who (*which) was absent, resigned.

For these sentences, the personal relative pronominal 'who' appears in a clause that modifies the subject NP. These sentences simply reinforce the distinction between the semantic functions of subject and predicate, that part of sentence meaning which is attributable in part to the subject-predicate structure of the sentence. For interpretation, it seems that we focus on the extension of the subject, and on the intension of the predicate.

A case could plausibly be made for analyzing the second proper name used in these sentences predicatively. Proper names certainly have intensions. There must be some criteria by which speakers apply names correctly to the individuals named.[6] It certainly seems possible for speakers to attribute the property of being x, where x is a person, in just the same way that one can attribute any other property to an individual Consider the following sentences.

10 (a) This is Jan.

(b) Jan is this (?)

(c) This is my tennis partner.

(d) My tennis partner is this (?)

In 10 (a), I would argue that 'is Jan' is predicated of a certain being in the same way as 'is my tennis partner' is in 10 (c). Clearly in these sentences which say "a is b," one NP functions as the subject term (e.g., 'this'), while the other one functions as the predicate term (e.g., 'Jan', 'my tennis partner'). The sentences in 10 above do not meet even the necessary linguistic criteria for expressing identity statements. That is, the subject and predicate NPs are not permutable, as shown in 10 (b) and (d).

Finally, is it possible that sentences that seem to say "a is a" might not express genuine identity statements? Consider the following examples.

11 Children will be children.

12 (a) Charles is Charles today.

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[6] I will not argue for this point here, but see Sommers (1982: chs. 11-12) who does. Here he develops a theory of proper names treating both aspects of their meaning which I call "intensional" and "extensional." Also at the level of discourse analysis, where the elements of the sentence are analyzed for their information value, whatever appears in the subject position is usually taken to be given, whereas the predicate position is said to contain new information. On this view, the subject and predicate NPs are taken to have different functions in the communication process. Ayer (1976: 17-24), e.g., considers the information value of proper names. He argues that propositions of the form 'a is b' are contingent even when 'a' and 'b' are proper names, since proper names do not have standard intensions but vary from one speaker to another. According to him, different proper names for the same individual may carry different implications.

12 (b) Charles is being Charles today

(c) Charles is himself today.

(d) Charles is being himself today

Although these sentences say "a is a" or "x is x," I would suggest that even when 'be' joins two tokens of the same expression, the two tokens may suggest different criteria for determining the same entity or class of entities Consider sentence 11 The first token of 'children' is perhaps interpreted extensionally (i.e , as the necessary conditions for belonging to the ontological type denoted by 'children') while the second token may suggest additional properties such as Putnam's "stereotypical" ones, or even connotational or contextual ones Thus, the subject NP might apply extensionally to determine a type of human beings of a certain age, while the predicate NP might determine the very same extension as the subject NP but, additionally some stereotypes, e g., their behaving in a certain way Recall that it is the intension that determines the extension, and that different intensions may determine the same extension, but not the reverse This kind of interpretation seems necessary for understanding the point of speakers' uttering such sentences as 11 and 12 in the first place

In this section, I have reviewed the linguistic criteria necessary for the analysis of a sentence as an identity statement. It appears that "true" identity statements, i e., statements which really mean "a = a" or "a = b," are very rarely expressed in ordinary sentences of natural language. In any case, they are expressible in English only in sentences of the form [NP be NP], where the NPs are proper names or singular definite descriptions, containing no variables or indexicals. The most important observation is the following. For any given categorical sentence of the form [NP be NP], the first NP functions as the subject of the sentence and the second, as the predicate complement. For some sentences that say "a is b," the expressions that function respectively as the subject and the predicate complement are permutable (e.g., 3-5 above). Whether their extensions can be characterized as 'personal'/'non-personal', etc., for a single sentence, the semantic relationship between the subject and predicate can be adequately analyzed in all cases as that of attribution. That is, 'be' and whatever is governed by it is predicated of the referent of the subject NP. This analysis extends naturally to all

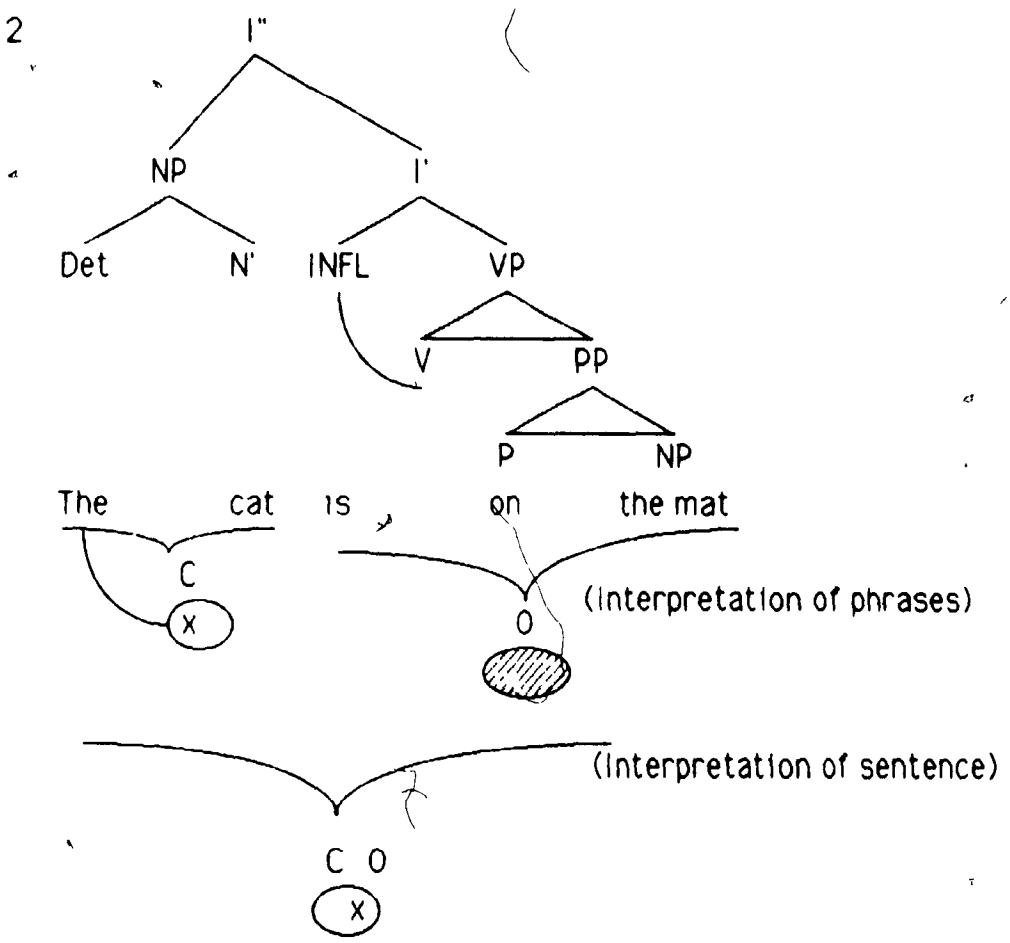
sentences of the form [NP be XP], unlike the analysis of categorical sentences in terms of the identity relation, as I shall argue next.

4.2.3 Linguistic analysis of sentence meaning

The final arguments that I will present in support of the analysis of 'be' as an explicit sign of the relation of attribution concern the assumptions underlying the theoretical framework of generative grammar. Within this framework, a semantic analysis is expected to be strictly compositional in that it is fundamentally tied to the syntactic description of sentence structure. Also the analysis is expected to be explanatory. In the case at hand, the analysis should provide some sort of justification, at least in part, for the use of the same phonological verb 'be' in so many different sentence types. Naturally, it is assumed that any explanatory theory is necessarily adequate from a descriptive point of view, i e , it is consistent with and can account for the natural language data available As described in Chapter 3, the relation of type attribution is taken as fundamental in the compositional semantic analysis of categorical sentences containing 'be'. The phrases that function as the predicate complements of these sentence types are said to denote ontological types. This holds for all sentences of the form [NP be XP], where X may be N, A, V, or P. Consider a sentence in which XP is PP, such as the following.

1 The cat is on the mat.

The NP that functions as the subject, e.g., 'the cat', is interpreted as a single entity and the VP that functions as the predicate, e.g., 'is on the mat', is interpreted as a type that belongs to the category of location. If this account of the semantic interpretation of the constituent phrases of such sentences is correct, then the interpretation of the whole sentence can be described as the attribution of a certain type to the referent(s) of the subject NP. The rule of semantic interpretation that accounts for the subject-predicate relations of sentences containing 'be' is generalized as follows. The referent of [NP,I"] belongs to the type denoted by [XP,[$_V$ be]]. This is the paradigmatic interpretation of the subject-predicate relations of elementary sentences containing 'be'.



The construal rules for the constituents of the major phrases NP, VP, AP, and PP are described in Chapter 3 This notion of *belonging to a type* actually underlies the interpretation of all categorical sentences regardless of the syntactic category or the semantic interpretation of the linguistic expressions that function as the predicate complements of 'be', whether proper names, definite or indefinite descriptions, general descriptions (adjectives), or locative phrases, etc. The same notion of *belonging to a type* is also presupposed (assumed) in the use of all referential phrases, in sentences of any type.

Next I shall illustrate some of the difficulties in applying an analysis of 'be' as the identity relation to sentences of all types. As a representative of this approach to the analysis of 'be', Cresswell (1973) maintains "that the *is* of identity and the *is* of predication are the same," but he analyzes both in terms of identity. For the sentence in 3,

3 Bill is a man.

Cresswell explains his analysis as follows: "the property of being identical with a man applies to Bill," i.e., that Bill is a man." He further elaborates: "being identical with a man means being identical with something which is a man .." (Cresswell 1973. 183) Overall Cresswell's analysis is not implausible. I do not wish to bring his grammar into question, but I do quibble over his choice of the concept of *identity* for the analysis of the verb 'be' in categorical sentences of English, if I interpret him correctly

The first problem to notice is this. The identity analysis is natural only for sentences of the form [NP be NP].[7] Any attempt to extend it to sentences containing predicate complements that belong to the major lexical categories other than NP automatically involves a certain artificiality To see the difficulties, consider a sentence containing a predicate complement of the category AP

4 The volcano is active.

The identity analysis involves at least three main steps, each requiring a different principle or rule. First, we need to determine the extensions of the categorematic lexical items and phrases. The referent of the phrase 'the volcano' belongs to the type denoted by the general noun 'volcano'. Certainly the identity relation will not do as a function from intensions to extensions, unless these two constructs are taken to correspond to the same things. As a second step, another rule must introduce a volcano into the extension of the predicate phrase. Cresswell (1973: 182) suggests such a move, providing a "context-determined" rule. On this analysis, for a sentence about a volcano, the extension of the predicate phrase would have to contain a volcano, but not necessarily any geysers, for example. As a

[7]Even for sentences of the form [NP be NP], the interpretation required seems excessive. Consider the following sentences analyzed by analogy with 3 above.

(i) Bill is a man.
(ii) This (man) is Bill.
(iii) Bill is Bill.

"The property of being identical with Bill applies to Bill ... being identical with Bill means being identical with something which is Bill." On my view, it is simply the property of 'being Bill' that applies to Bill, which I claim is what sentences (ii)-(iii) say. According to Sommers (1982: 131), the analysis of 'be' as identity would have all of these sentences above "saying the same thing."

final step, then a rule of interpretation effects the semantic relation between the subject and predicate phrase of the sentence. For the identity analysis, this rule must state that the volcano being talked about is identical with a volcano which is active. Certainly this interpretive procedure is more complicated than a straightforward compositional semantic analysis which does not need to introduce an entity as a "standard of comparison" or as the entity that is said to be identical to the referent of the subject NP. Furthermore, this kind of analysis would be difficult to defend from the viewpoint of explaining how natural languages are learned. When features are introduced into a level of deep structure, as Cresswell's are, and they never appear in surface structure, there is no apparent basis for learning the features. Perhaps one could argue that by analogy with the interpretation of predicate NPs, the speaker could posit the extra entities and structure for all other predicate phrases. But then, if APs have underlying entities specified, it is a wonder that speakers do not use APs alone in the subject position as well. This is possible in sentences of English only when the adjective can be nominalized, e.g., determined by a definite article.[8] In any case, the identity hypothesis requires two logical subjects, instead of just the one that is exhibited grammatically in surface structure. A second logical subject is required by the rule of identity, which could then apply to the subject and the predicate of the sentence. This contrasts with the conceptual analysis of 'be' as the relation of belonging to a type. In my proposal, the rule of interpretation for the sentence containing 'be' requires only one logical subject.

In contradistinction, the notion of *type attribution* extends naturally to account for the interpretation of sentences containing 'be' and predicate complements of all major categories. In the semantic analysis that I propose, it is necessary to consider only the basic concepts that are designated by the lexical items actually contained in the sentences. Also the semantic analysis obviously depends fundamentally on the syntactic structure, and sentences can be interpreted compositionally. All categorematic expressions are interpreted and no "extra" entity which does not correspond to a formal

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[8]For example, consider the following sentences, in which an AP clearly determines a whole class or type, but not an individual.

(i) Clever never attend any lectures (*)

(ii) The (*a) clever never attend any lectures.

(iii)(Some/all) clever ones never attend any lectures.

or structural unit in the syntax is introduced by the analysis. In short, the analysis of 'be' as the relation of type attribution encounters none of the difficulties that prevail in the analysis of 'be' as the identity relation.

The argumentation that I have offered in this section is oriented primarily towards the refutation of the conceptual analysis of 'be' as the identity relation. In other words, I have attempted to demonstrate that the relation of identity is <u>not</u> the correct analysis or definition of the verb 'be' in English. I have perhaps succeeded in doing this, rather than having demonstrated positively that 'be' is correctly analyzed as a sign of type attribution. For the purposes of semantic analysis, in all respects, the identity relation is simply less general than the relation of belonging to a type. The identity relation is a special case of type attribution. The identity relation can apply naturally only to some sentences of the form [NP be NP], where the two NPs denote the same types. (They would be synonymous.) As illustrated in Chapter 3, the attribution principle seems to apply systematically to all sentences of the form [NP be XP]. Therefore, the relation of belonging to a type, rather than identity, seems more appropriate for the conceptual analysis of the verb 'be' in English.

The semantic analysis of 'be' that I proposed in Chapter 3 is consistent with the simplest hypothesis concerning the structure of natural languages. Natural language is characterized as an abstract system containing a finite set of basic identifiable elements and a small set of rules for combining as well as interpreting them. From this base, it is possible to generate a boundless set of grammatical (well formed) sentences. The simplest hypothesis concerning the interpretation of categorical sentences containing 'be' in English is that 'be' is a single lexeme. In the context [NP___XP], 'be' is always analyzed here as the same underlying concept. The one-lexeme analysis of 'be' accounts at least in part for the use of a single verb in sentences that express so-called "identity statements" and those that explicitly express a mere relation of subject and predicate (i.e., predication or attribution).

The strongest positive argument for the conceptual analysis of 'be' as the <u>attribution</u> of a type would seem to be the following. Predicates containing 'be', i.e., 'be + XP', are all interpretable as 'attributive being', regardless of the syntactic category of the constituent that functions as the

predicate complement and regardless of the ontological categories that correspond to the respective subject and predicate terms. Regardless of how it may be used in any context of utterance, a sentence of the form [NP be XP], analyzed as subject and predicate, seems to express a relation of attribution, which can be described extensionally as a referent's or referents' belonging to a type. However, since XP may also contain a referring expression, categorical sentences will be analyzed as monadic propositions only when the corresponding sentences involve only one referent or one set of referents.

4.3 Is there a semantic distinction between 'be' Aux and 'be' V?

In the context of describing "there-insertion" sentences, Williams (1984) analyzes 'be' in English as two separate lexical items. In this section, I will examine the semantic distinction that he makes between the 'be' that functions as an auxiliary verb and the 'be' that functions as a full verb. The two categories are formally distinguished as illustrated here.

1 John [is]$_{Aux}$ obnoxious.

2 John [is]$_{Aux}$ [being obnoxious]$_{VP}$

According to his analysis, 'is' in 1 and 2 belongs to the syntactic category Aux, while 'being' in 2 belongs to the syntactic category V. Williams asserts that the two 'be's can also be distinguished on semantic grounds. (For my discussion of his syntactic analysis, see 2.2.1.) In this section I will focus on his semantic description. According to him, they can be distinguished in terms of the notion of *intentionality*. Williams (1984: 138) claims, only as a full verb does 'be' entail "intentionality on the part of the subject." For the two sentences above, the semantic difference between them is attributable to there being two distinct 'be's that are employed here. But since his 'be' Aux is an auxiliary only by stipulation in the lexicon, in this section, I will try to determine the real source of the alleged semantic distinction between the two 'be's as described by Williams. I take exception to the idea that the verb 'be' has any connection with the concept of *intentionality*. Rather I would attribute the semantic distinction between the two sentences above to the different forms of the verb 'be' in 2, the use of the so-called "progressive" 'being', which is evidently absent in 1. Consistent with my one-

lexeme hypothesis concerning 'be', I would deny the need to postulate two different lexical items to account for this distinction One of the basic problems with a two-lexeme hypothesis is its failure to state important generalizations concerning 'be' For example, 'be' is always copular, even the "progressive" form 'being' always takes a complement XP, where X may be a member of any major category.

Incidentally, Williams' attribution of any meaning at all to the verb 'be' is a welcome innovation in linguistic description (See 4.1.2) Nevertheless, the particular meaning that Williams would assign to the verb 'be' needs clarification His claim is stated rather loosely and he does not explain his semantic analysis in detail or propose any semantic rules I shall attempt to give one interpretation of his claim that seems plausible from a linguistic semantic point of view *Intentionality* is a rather complex notion, if by using this term, Williams has in mind the subject that is treated seriously in philosophical literature (by Husserl, e.g., as described by Smith and McIntyre 1982 or in *Husserl, intentionality and cognitive science*. 1982). If it is this notion that is intended, then clearly the only intentionality that could be ascribed in the use of the verb 'be' in every context would be to the speaker of the sentence, rather than to the referent of the subject. Appealing to intentionality in this sense would bring the analysis of this lexical item into the domain of pragmatics In that case, this question would be beyond the scope of my investigation. My intention is to provide a conceptual analysis of the lexical item 'be' within a framework of generative grammar. I shall examine Williams' claim only in this context

First I will explore Williams' claim that the verb 'be' ascribes "intentionality to its subject." Obviously, by "subject" here, he can only mean the referent of the grammatical subject (Williams 1984: 135). It seems that Williams would claim that part of the intension or sense of the verb 'be' that it contributes to a sentence is the condition that the referent of the subject NP intend to exhibit a certain property For the sentence in 2, the person named 'John' that is spoken about intends to be obnoxious. Or at least, perhaps one could say that the speaker must believe that one John intends to behave in an obnoxious way. But it is certainly not obvious in all cases that the speaker must hold any such belief about the person being attributed properties by the use of the verb 'be' (or the form

'being'). In fact, the speaker could hold the contrary belief. For example, a mother could say the following sentences to or about her baby, but she would not normally believe that it intended to behave in such a way. This is stated explicitly in 3 (a).

3 (a) I know you don't mean to be, but you're being a pain today

(b) You're being very difficult today

(c) Gaby is being a delight today

(d) Gaby is being sick again.

In fact, the mother would know that the baby probably could not even comprehend the notions expressed by 'being a pain', 'being a delight', 'being very difficult'. Even if the sentence were uttered with irony or sarcasm, I think that the utterance of the sentences 3 (a)-(c) at least reveal just as much, if not more, about the speaker's attitude toward the referent of the subject NP (i.e., the person's behaviour) than it reveals about the intentions of the referent itself. We might thus take these sentences to constitute counterexamples to the claim of Williams that the verb 'be' "entails intentionality on the part of the subject."

To verify the underlying semantic components of a lexical item, linguists ordinarily use the phenomena of contradiction and redundancy. For instance, if someone is said to be a bachelor, then the expression 'married' cannot be predicated of him (or her) without contradiction. Therefore, the concept *married* cannot be associated with the lexical item 'bachelor'. A sentence such as 'Pat is a bachelor, but he is married' would require an explanation. Since the expression 'married' renders the sentence contradictory, it would not be postulated as a component of the intension of 'bachelor'. On the other hand, it is redundant to mention properties that correspond to component parts of the intension. In the sentence, 'Pat is a bachelor and he is unmarried', there is clearly a redundancy since the expression 'unmarried' designates a component of 'bachelor'. Now, to show that intentionality (as expressed by the verbs 'intend' or 'mean') is not a part of the meaning of the verb 'be', I will consider the sentences in 1 and 2 in connection with the principles of contradiction and redundancy.

4 (a) John is obnoxious, although (I know) he does not mean to be

(b) John is obnoxious, and (I know) he means to be.

5 (a) John is being obnoxious, but he does not intend to be.

(b) John is being obnoxious, and he intends to be

I find all of these sentences perfectly acceptable Nothing needs to be explained The attribution of intentionality to the referent of the subject does not render the compound sentences contradictory or redundant. Therefore, I would conclude that the notion of *intentionality* is not part of the conceptual content of the verb 'be'.

Alternatively, to refute Williams' claim, one could look for examples of sentences in which 'be' functions as an auxiliary where the attribution of intentionality to the referent of the subject NP would seem entirely appropriate. In this case the referent of the subject NP would "intend" to exhibit the property designated by the predicate complement. Is it ever possible to understand intentionality from sentences containing 'be' Aux as analyzed by Williams? Although I have concluded that intentionality is not an element in the conceptual analysis of the verb 'be', such a notion might be inferred from other lexical items in sentences containing it. For example, would the situations described by the following sentences beplausible unless the referents of the subject NPs could also be ascribed a conscious purpose?

6 (a) Max is the winner of an Olympic gold medal.
Is Max the winner of an Olympic gold medal?

(b) Jim is a virtuoso violinist
Is Jim a virtuoso violinist?

6 (c) Harry is a liar.
Is Harry a liar?

These tokens of 'is' must be analyzed as forms of 'be' Aux, since they all have corresponding question forms in which inversion of the subject and Aux is assumed. Presumably if intentionality were ascribed to the referent of the grammatical subjects in 6, then it could not be attributed to the copula 'be'. On the other hand, the predicate complements might be conceived as a possible source of a sense of "intentionality" if this were indeed signified by these sentences. (In fact, this is a common problem in

the semantic analysis of natural language sentences. It often seems difficult for linguists and philosophers of language to determine precisely which formal element in the sentence a particular element of sense should be attributed to) As Williams himself observes, certain predicate complements of 'be' seem to denote qualities or properties that are "controllable" while others denote qualities or properties that are not He finds the following sentence ungrammatical

7 John is being dead (*)

Concerning this, Williams (1984, 141) writes

> . Since there are two *be* s, the second one must be MV *be* . This verb ascribes intentionality to *John*, but *dead* is a durative state presumably not under John's control at this point. Contrast this with ... [sentence 2 here--ems] where the predicate *obnoxious* is controllable.

Williams makes interesting claims concerning the distribution of the two 'be's of his analysis. He gives examples to illustrate that 'be' Aux can occur in clausal constructions (such as tensed sentences, infinitives, gerunds, non-restrictive participles, nominative absolute constructions as in 8 below)

8 (a) John is dead.

(b) to be dead

(c) his being dead

(d) John, being dead

(e) John being dead

but not in non-clausal constructions (such as perception-verb complements, causative verb complements, perception verb stem complements, restrictive participles as in 9)

9 (a) I saw John being dead (*)

(i) I saw John being obnoxious.

(ii) I saw John dead.

(b) I made John dead (*)

(c) I saw John be dead (*)

(d) The man being dead is here (*)

It is not completely clear whether Williams considers the asterisked sentences to be unacceptable because of the AP 'dead' or because the incorrect 'be' (Aux as opposed to V) has been inserted into the sentences. He claims that "predicates such as *dead* are permitted in the clausal constructions," e.g., in 8, but "should be excluded from non-clausal constructions," e.g., 9 (Williams 1984. 141) He does not, however, formulate principles to account for the use of predicate complements such as 'dead'.

My judgment concerning the grammaticality of the asterisked sentences in 7 and 9 differs from Williams'. It seems that if the verb 'be' could be said to "ascribe intentionality" in any context, then it should do so in every context. To provide a suitable context for the sentences in 9, suppose that John were an actor and the speaker were the director or script writer of a play in which John performs the role of a character that is supposed to die. In this context, I would find the sentences in 9 to be perfectly grammatical and acceptable. Now in view of this, it is uncertain what to make of Williams' argument here. To be sure, the source of the sense of "intentionality" that the sentence allegedly expresses is not at all clear.

To make matters worse, there seems to be a conflict between Williams' structural and semantic criteria for the verb 'be'. To distinguish 'be' V from 'be' Aux, apart from the semantic criterion of ascribing intentionality to the referent of the subject NP, Williams also provides a formal clue. When there are two 'be's in the sentence, he says, the second one must be a verb (Williams 1984: 141). If so, then 'being' in the following so-called "passive" sentences should be a form of the verb 'be'. I have deliberately selected NP subjects that denote inanimate entities to contradict the intentionality requirement.

10 (a) The fire station is being constructed at last.

(b) The car is being washed.

(c) The radio is being repaired.

(d) That very issue was being debated in the House.

Whether or not this 'be' ('being' here) should be analyzed as an Aux or as a V, it could not reasonably be used to ascribe intentionality to the referent of the NP that functions the grammatical subject of any

of these sentences. Rather, the superficial subject NP of a "passive" sentence, even in the "progressive" aspect, is traditionally said to denote an individual that is interpreted as the "patient" of the action. And "intentionality" would be ascribed to the "agent," whether it is expressed or not. Even "patients," however, in the case of human ones, may be intending agents Consider the following passive sentences containing 'being'

11 (a) The patient is being examined by a new specialist

(b) The patient is being operated on voluntarily

If indeed, 'being' here, as the second 'be' in each of these sentences, is a form of 'be' V, then the ascription of intentionality is completely irrelevant for its use. Thus, neither the structural criteria nor the semantic criteria proposed by Williams are quite accurate, as the sentences in 10 and 11 clearly provide counterevidence to his semantic analysis.

But Williams is quite correct to point out that sentences such as 1 and 2 above differ in meaning. These sentences are repeated here.

1 John is obnoxious

2 John is being obnoxious

The important question for semantic analysis is. To what should one attribute the difference in meaning? There is an obvious formal difference between 1 and 2. They differ in what has traditionally been called aspect, which is marked by the different forms of the verb, or different forms of 'be' in this case. Sentence 1 contains the lexeme 'be' in the simple present tense indicative (for 3d person singular), while sentence 2 contains 'be' (same person and number) in the non-past progressive, which would be analyzed by Williams as $[_{Aux}$ be] + $[_{V}$ being]. Both 'be's are followed by a token of the same predicate complement of the category AP.

There are several interesting proposals in linguistic literature concerning the semantic interpretation of the progressive in English. (See, e.g., Comrie 1976; Goldsmith and Woisetschlaeger 1982; Leech 1971; Scheffer 1975; Vendler 1969.) The principal differences that are most

commonly noted about the interpretation of progressive and non-progressive sentences are as follows. Consider the examples in 1 and 2. A non-progressive sentence such as 1, with only a simple finite 'be', denotes a static state, being the attribution of a property (contingent or necessary) to an individual named 'John', while 2, with the addition of the present participle of 'be', denotes a dynamic state, being the attribution of a momentary way of behaving. Although the static-dynamic dichotomy is not completely unproblematic, this seems to be the most common way to analyze sentences in the active voice containing the progressive form of 'be'.

Thus the notions of *intentionality* and *control* as employed by Williams might be related to the speaker's conception of the referent's relation to the property designated by the predicate complement. But notice, it is not the property designated by 'obnoxious' (as in 2) or 'dead' (as in 7-9) that is the object of control. For example, in 2, the property obnoxious is not under the control of John. It is being obnoxious that is the object of control. In 9, the property dead is not under the control of the actor. It is being dead that is the object of control. In my hypothesis, the progressive 'being' would always function as the head of the predicate complement phrase of 'be'. (For details concerning the syntactic analysis, see Chapter 2.) According to my semantic analysis of categorical sentences containing 'be', 'be' and whatever is governed by it are predicated of the referent of the subject NP. Thus, 'be' plus the semantic content of 'being + obnoxious' or 'being + dead' is attributed to the referent of 'John'. For this dissertation, I have not studied the semantic effects of any particular tense or aspect of 'be'. I leave the subjects of tense and aspect, in particular, the interpretation of the progressive form of 'be' for future research.

The interpretation of progressive sentences in English seems to vary systematically from the interpretation of non-progressive sentences. Although, as Vendler (1969) observes, the progressive forms of verbs of different classes (verbs that denote processes, achievements, etc.) have slightly different interpretations, there does not seem to be any good reason to assume that the -ing form of the verb 'be' does not have a particular progressive aspectual interpretation. But this does not lead me to conclude that there are two different lexical items 'be'. The fact that it is possible, or that it is even necessary, to interpret sentences containing the -ing form of 'be' in a way that differs from the

interpretation of sentences containing only a simple form of 'be' (i.e., 'am', 'are', 'is', 'was', 'were') and other forms does not seem to constitute a very strong linguistic argument to support a two-lexeme analysis of 'be' In particular, it does not provide definitive support for Williams' two-lexeme analysis of 'be' I think it is highly improbable that the sentences in 1 and 2 contain two different lexemes 'be', one the copula Aux, the other, the copula V A one-lexeme analysis of 'be' is, however, strongly supported by the morphosyntactic evidence given in Chapter 2 Thus it seems clear that we may correctly attribute the particular meaning of sentences such as 1 and 2 to the particular form of the verb—especially since it appears that a speaker may use this form only when this particular interpretation is possible, as in the case of sentences with progressive 'be'

For a sentence of the form [NP be XP], changing the form of the verb is only one of the ways to vary the semantic content of the sentence. But there are other ways to do this. One may also vary the semantic content of such sentence types by changing the determiners and terms of the obligatory NP subject or by changing the predicate terms or the type or category denoted by the XP. Thus, I would conclude that the possibility of expressing various tense and aspectual relations between predicate terms and the referents of the subject terms in such sentences should not have any lexical significance for 'be' in English.

4.4 Idiomatic sentences containing 'be' with fixed subjects

In this chapter, I have examined several classifications of the "senses" or "uses" of 'be'. I have also considered evidence for how many verbs 'be' there are in modern English. I claim that there is only one lexeme 'be' in modern English. In general I have argued that multivocal analyses of 'be' reflect the meaning of the whole sentence, rather than the meaning of the lexical item 'be' alone. All of the analyses that I review here seem to attribute to the verb concepts that are properly contributed by the subject and/or predicate terms that occur with 'be' in categorical sentences or to the combination of these phrases.

I claim that there is one verb 'be' in English and it is analyzed conceptually as type attribution. I should emphasize that the lexeme 'be' that I have analyzed occurs in well formed

sentences of English in the following syntactic context [NP___XP] I have only considered examples in which both N and X are categoremata. They both denote ontological types or categories independently But if there is only one lexical item 'be' in English, as I propose, then a single lexical entry must account for all "uses" of the verb The lexical entry for 'be' must presumably also contain instructions for the "uses" of the verb to which the general rules of semantic interpretation do not apply. I refer to these as "idioms" in English, e.g., sentences of the form [there + be + NP indef] and [it + be + weather AP/VP], etc. The grammatical formatives 'there' and 'it' may occur only in subject position and they are not categorematic. That is, they do not denote types of entities. They do not belong to a major ontological category or have any obvious extensions. Clearly the interpretive principle that I proposed for categorical sentences in Chapter 3 would not apply to sentences of these types. Although what I call "idiomatic uses" might, however, count as polysemic or derived senses in some accounts of lexical semantics. I maintain that the sense of the verb 'be' does not vary in these contexts. Rather I would argue that the different interpretations for these sentences again depend upon the conceptual content of the phrases that function as subjects and predicate complements. (For an analysis of English sentences used to talk about the weather, see Stvan 1980.) I will conclude this section by exploring tentatively an approach to the interpretation of the so-called "existential" sentences containing 'there' and 'be'.

Alternative syntactic analyses of sentences containing 'there' that have been proposed within generative grammar are reviewed in Williams (1984). Many linguists seem to agree that such sentences can be analyzed superficially as [NP be NP], the first NP being 'there' and the second being restricted to indefinite descriptions. Apart from the existential use, the main function of such sentences seems to be to identify and introduce a logical subject for discourse. Fairy stories in English, e.g., usually begin 'Once upon a time there was an X' and subsequent sentences use the complement 'X' as the grammatical subject, e.g., 'The X was ...' But only one 'there + be' sentence can introduce one and the same subject in a single text. Consider the following text.

1 (a) There is indeed a Santa Claus.

(b) Is there indeed a Santa Claus?

(c) Santa Claus lives at the North Pole.

(d) He is married.

I maintain that the subject and predicate phrases of existential sentences are in some sense completely idiomatic. Or at least, 'there-be' sentences are syntactically idiomatic in that the order of the subject and predicate terms is reversed obligatorily. As I would analyze it, 'there' functions idiomatically as the grammatical subject of the sentence, as illustrated, e.g., by "Subject-Aux inversion" in 1 (b). However, number agreement holds between the verb and the second NP, which is categorematic. Semantically, the subject and predicate phrases are clearly reversed. A referent is introduced into the domain of discourse by the indefinite NP, while the 'there + be' sequence functions as an idiomatic predicative expression. Here 'there' stands for the pragmatic domain of discourse. The most positive feature of the analysis is that 'there-be' sentences, like many other elementary sentences containing 'be', are analyzed as monadic propositions. In terms of the relation of attribution, affirmative declarative sentences of the form [there + be + indefinite NP] would be interpreted or analyzed extensionally as follows. The referent of [NP,VP]) belongs to the domain of discourse D (denoted idiomatically by [NP,I"]). For my purposes, the important point to notice is that 'be' can still be analyzed conceptually as the attribution relation. The referential indefinite NP phrase of many sentences beginning 'there + be' are complex and in fact contain the type that would be attributed by the predicate complement of ordinary non-idiomatic categorical sentences. However, the analysis of 'there-be' sentences is clearly not the main subject of this work. It obviously needs much more attention.

Chapter 5

Assignment of thematic relations to arguments versus a categorical analysis

In Chapter 3, I presented a semantic analysis of the general subject-predicate relations expressed by categorical sentences in English. These are sentences of the form [$_{I}$-NP be XP] such as the following.

1 (a) Pat is a bachelor.

(b) This carrot is raw.

(c) The cards are on the table.

(d) His boat is being repaired.

'Be' in English is taken as an explicit sign of attribution. Attribution is effected grammatically by the linking of a predicate phrase to a subject phrase. This relation, which is also called "predication," is obtained when the linguistic expressions (i.e., [NP,I"] and [VP, I'] are brought together into a particular syntactic relation by the maximal projection of the INFL category. According to my hypothesis, an affirmative declarative sentence of the form [$_{I}$-NP be XP] is interpreted as follows. the referent(s) of [NP,I"] (which belongs to an ontological type that may be denoted by [NP,I"]) belongs to the ontological type denoted by [XP, [$_{V}$-be]]. (See 3.1.3 for details.)

Semantic interpretation is characterized here as the process of determining the extensions of linguistic expressions on the basis of their intensions. I have characterized the intensions of categoremata as type concepts. The compositional process of determining the extensions of categorical sentences is described as a conceptual process of relating types denoted by the predicate complement of 'be' and the referent(s) of the subject NP. In this analysis, the extensions of the subject and predicate terms of categorical sentences are described as referents and types, respectively, and the extension of the whole sentence is seen as a state of affairs in which the referent(s) of the subject is/are said to belong to a certain type or types. Here the term 'type' means

an "ontological type," which can be classified according to a theory of categories as described by Aristotle or also in fact by Jackendoff

All of the sentences in 1 above contain a form of the verb 'be' And furthermore, this is the only lexical item that these sentences all have in common. This fact provides one motivation to look for a single rule of semantic interpretation for all types of sentences containing the verb 'be'. Since these sentences have no categorematic expressions in common, I would argue that the relation of attribution (interpreted as "belonging to a type") is the extent of the semantic similarities that all these sentence types share. In other words, the general relation of predication, conceived as type attribution, is only part (admittedly a very important part indeed) of the semantic analysis of elementary sentences containing 'be'.

In predication, the type(s) denoted by the predicate phrase is/are attributed to the referent(s) of the subject. But besides the subject-predicate relation that is invariably expressed by 'be', there are other semantic relations that are simultaneously expressed by categorical sentences Various other semantic relations may possibly hold between the types denoted by the subject and predicate. These relations depend on the intensions of the expressions that function as the subject and predicate terms. That is, semantic relations vary as the constituents of the subject and predicate vary. In this respect, the sentences in 1 may be said to express different relations between the denotata of the subject and predicate phrases. For example, the sentences in 1 express relations between an entity and a social status bachelorhood (a), between a certain vegetable and a condition (b), between a group of entities and a location in (c), if it is taken literally, and finally, between a certain vessel and what is happening to it (d). This analysis of semantic relations is based on the direct interpretation of the constituents of the phrases that function as the grammatical subject and predicate.

My objective in this chapter is to demonstrate the correctness of this approach. I will do so partly by offering negative criticism of an alternative approach to semantics that is often assumed within generative grammar. Here I will contrast my proposal with an analysis of the propositional content of categorical sentences in terms of semantic roles, or more specifically, according to the

(1972, 1976, 1978, 1983). I will assume that the reader is familiar with the works of these authors, and the general approach that is reviewed in § 3.2. Furthermore, I assume that these semantic constructs are properly characterized as relational concepts, which hold between the extensions of terms and verbs, as described in Styan (1983, 1984) In this chapter, I will apply the theory of thematic relations only to elementary sentences containing 'be'

According to the hypothesis of thematic relations, the lexical entry of the verb determines the thematic relations that are assigned to the NPs and other linguistic expressions that appear in the argument positions of sentences containing the verb. The abstract thematic relations that are assigned to arguments (i.e., expressions in particular syntactic positions) must be stated in the lexical entries of particular verbs. These lexical statements presuppose that for any predication containing a given verb the thematic relations of its arguments can be specified in advance. As a case in point, the verb 'be' is said to take two arguments and these are always assigned the thematic relations Theme (T) and Location (L). Thus, the various subject and predicate terms of elementary sentences containing the verb 'be' would be uniformly assigned the relational constructs of Theme and Location as illustrated in 2.

2 Syntax: 'be' : NP___XP

Semantics: BE (x, y)
T L

According to this hypothesis, it is possible to predict automatically at the level of the lexicon precisely which thematic relation is assignable to any complex expression (i.e., NP or XP) inserted into the positions marked by the variables. Thus, all the sentences in 1 are considered to have more semantic similarities than just the relation of attribution that is associated with the verb 'be'. The NPs and XPs that function as subjects and predicate terms would always receive the same assignment of thematic relations.

3 (a) Pat is a bachelor.
T L

(b) The carrot is raw.
T L

(c) The cards are on the table.
T L

(d) The boat is being repaired.
T L

The account of the semantic interpretation of elementary sentences containing 'be' based on the abstract notions of *Theme* and *Location* is quite different from the categorical analysis that I proposed in Chapter 3. For these sentences above, however, the only predicate complement that could be conceived as a location in any intuitive sense is 'on the table' in (c). The analysis of the subject NPs and the predicate complements as Theme and Location, respectively, does not offer a very informative account of the semantics of all elementary sentences containing 'be'. Furthermore, as I shall observe in this chapter, thematic relations presuppose entities that are classifiable according to ontological types and categories. I shall argue that these entities and types are basic and provide the conceptual structures that are operative in semantic well-formedness rules. Thematic relations are thus derivable, just in case they should prove necessary for the explanation of grammatical or semantic phenomena. I see no need of them in linguistic analysis. In the present chapter, I will question the adequacy of the theory of thematic relations as a basis for a semantic description of elementary sentences containing 'be' and thus its explanatory value as a semantic theory for natural languages. I do not intend to say here that thematic relations could play no role in syntax but that the use of semantic labels in syntactic description is misleading.

This chapter is in two parts. First, in 5.1, I will briefly examine the general notions of *Theme* and *Location*. I will argue basically that the definitions of these thematic relations are so vague and general that they give no more clue to the sense of a sentence than the relational terms 'subject' and 'predicate complement'. Proponents of the theory of thematic relations attempt to justify these semantic constructs on the basis of their relevance to the explanation of intersentential relationships. In 5.2, I will note the relative merits of the theory of thematic relations and a theory of ontological types and categories in accounting for semantic phenomena such as acceptable active-passive sentence pairs (5.2.1), acceptable question-answer pairs (5.2.2) and finally linguistic inferential

relationships among sentences (5 2 3) As I shall explain, the problem for thematic relations is that these constructs are applicable only to single sentences in isolation A classification of ontological types holds across sentence boundaries and is conceptually more fundamental and general, whereas thematic relations depend on the verb of the sentence

5.1 Theme and Location

According to the theory of thematic relations, every well formed sentence containing the verb 'be' in English must contain a NP that is assigned the thematic relation Theme and another phrase that is assigned the thematic relation Location, as illustrated below

1 'be' [NP___XP]
| |
T L

I will argue in this section and the next that the obligatory NP and XP in all elementary sentences containing 'be' cannot be analyzed in an intuitive way as Theme and Location, respectively, as claimed by Gruber and Jackendoff Basically, what I wish to question here is the general idea that there is only a limited number of substantive "conceptual" relations (thematic relations) that can be expressed in sentences of natural language To begin with, I will use the very data that Gruber and Jackendoff themselves present Whereas they attempt to show how the basic thematic relations recur repeatedly in sentences that speakers use to talk about different situations, I will attempt to show that semantic relations vary according to the ontological types of the entities that are related by various verbs. I will attempt to demonstrate that what is taken to be a limited number of "conceptual building blocks" (Jackendoff 1978: 228) may be the effect of syntactic (grammatical) constraints on the expression of semantic relations. In this section, I will examine the general thematic relation Theme, and later, in 5 2 2, I will examine the general relation Location.

First, I will consider the question: What is the Theme? This question is ambiguous. It could be used to inquire about the essential nature of the construct called 'Theme' or how to determine which expression in a particular sentence is assigned the thematic relation Theme. In this section, I shall try to answer both of these questions

According to Gruber (1976: 38), Theme is the only relation that is "an obligatory element of every sentence" in English [1] One NP in every sentence of English denotes an entity that is conceived as Theme Since a Theme must be present in every event or state of affairs that is described by sentences of natural language, it corresponds to a very general relational notion. Relations imply entities, and Gruber and Jackendoff characterize thematic relations in terms of the entities involved (i e , in terms of the domain of the relation) Theme is therefore defined according to the different contexts in which it occurs. With verbs of movement, the Theme is said to move; with verbs of change, the Theme is said to change; with verbs of location, the Theme is said to be located somewhere, with agentive verbs, the Theme is said to be affected by the Agent's action, and so on. In order to identify the Theme, according to the theory of thematic relations, it is first necessary to analyze the verb of the sentence as a CHANGE, STAY, BE verb or as an agentive verb Since there are seven classes of verbs according to Jackendoff (1976: 110), there must be seven classes of Themes. But the subclassification does not stop here. Both Gruber and Jackendoff specify four further subclasses of verbs according to semantic fields, such as positional, possessional, identificational, and circumstantial. These parameters may apply to each of the verb classes, so that within the thematic relations framework, at least 28 subclasses of Themes are theoretically recognized. Apparently a NP denoting any entity or type in the whole universe could bear the relation of Theme

While Gruber and Jackendoff insist on the sameness of the concept of Theme that "naturally" extends to all of the different contexts (Jackendoff 1976: 100), I would point out the differences between the various kinds of relations that they identify as Theme. In the examples that follow, taken for the most part from Gruber (1976) and Jackendoff (1976, 1978), much of the sameness may stem from the use of the same verb in different contexts. The expressions that are underlined in the sentences below denote entities that may be conceived as Theme. Because it has fewer letters, I will use the primitive predicate GO, instead of CHANGE here.

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[1] In many alternative hypotheses of semantic roles, a similar claim is made: e.g., the "nominative" case (Anderson 1971: 50), "patient" (Starosta 1978: 472), "affected" participant (Halliday 1969: 169), are all obligatory.

1 $GO_{Positional}$: An apple fell from the tree to the ground.

2 $GO_{Possessional}$: Will inherited a million dollars from his father.

3 $GO_{Identificational}$: The metal turned red.

4 $GO_{Circumstantial}$: The circle suddenly switched from turning clockwise to turning counterclockwise.

5 $STAY_{Positional}$: The coach remained in the driveway.

6 $STAY_{Possessional}$: The iguana stayed in Max's possession

7 $STAY_{Identificational}$: The book did not remain that expensive.

8 $STAY_{Circumstantial}$: The wheel kept spinning.

9 $BE_{Positional}$: The circle contains the dot.

10 $BE_{Possessional}$: The library has the book.

11 $BE_{Identificational}$: The pumpkin seemed tasty

12 $BE_{Circumstantial}$: The car is sputtering.

13 $CAUSE...GO_{Positional}$: Linda lowered the rock to the ground

14 $CAUSE...GO_{Possessional}$: Harry gave the book to the library

15 $CAUSE...GO_{Identificational}$: Dollie made Martin happy.

16 $CAUSE...GO_{Circumstantial}$: Dick forced Max to talk.

17 $CAUSE...STAY_{Positional}$: John kept the dog in the house.

18 $CAUSE...STAY_{Possessional}$: Max kept the model train for years.

19 $CAUSE...STAY_{Identificational}$: Maxine keeps her hair short.

20 $CAUSE...STAY_{Circumstantial}$: Laura kept David working.

21 $LET...GO_{Positional}$: Laura released the air from the balloon.

22 $LET...GO_{Possessional}$: Dick accepted the pony from his father.

23 $LET...GO_{Identificational}$: Henry let Noga get sick.

24 $LET...GO_{Circumstantial}$: Laura allowed David to start working.

25 $LET...STAY_{Positional}$: Linda left the rock on the ground.

26 $LET...STAY_{Possessional}$: Will retained his fortune.

27 LET...STAY$_{Identificational}$. Manny left the car dirty.

28 LET...STAY$_{Circumstantial}$. David let Linda keep on laughing.

Besides these 28 classes of Themes that are created by extending the notion of *Theme* to all seven verb classes, which are modified, in turn, by the four different parameters, Gruber and Jackendoff describe yet other kinds of Themes. These include extensional Themes (illustrated in 29-31) and "coreferential" Themes (32-34) in which the same referent enters into more than one thematic relation simultaneously (Jackendoff 1972. 34-36).

29 Extensional, Positional: The road extended from Altoona to Johnstown.

30 Extensional, Identificational: This theory ranges from the sublime to the ridiculous

31 Extensional, Temporal: The conference lasted from Tuesday to Friday.

32 Agent-Theme: John ran into the fire (intentionally)

33 Source-Theme: The rain cloud developed into a tornado.

34 Goal-Theme: Sam carved a calf out of marble.

There are several ways to cross-classify the criteria by which the 34 classes of Theme are characterized. From one perspective, the Theme can be identified by the other thematic relations with which it associates. In the positional parameter, the Theme is specified with respect to the physical environment in which it is said to move from one place to another, where it is said to stay or to be located. In the possessional parameter, the Theme is specified with respect to its possessor. The Theme is said to be transferred from one possessor to another or its possessor is said to be unchanging. In the identificational parameter, the Theme is specified with respect to a property, changing or unchanging. In the extensional parameter, the Theme is specified with respect to the extent of its extremities. In the circumstantial parameter, the Theme is said to be involved in a circumstance, changing and unchanging. In other words, the nature of the thematic relations depends not only on what the entity analyzed as Theme is doing or is, etc., but also on the other thematic relations in terms of which the Theme is specified. Consider the possible Themes that might be expressed by the subject of the verb 'be'. The thematic relation Theme is assigned to the underlined NP.

38 (a) Stanley is in Africa

(b) The triangle is a geometric figure

(c) This man is my son

(d) The pumpkin is tasty

(e) The car is sputtering

(f) Emma is being insulted

(g) This tea is 200 years old

(h) The concert is at 8 p m

(i) He is in love

(j) Your hat is hanging in the closet.

Although the relations involving the referents of the underlined NPs are presented as examples of the single concept *Theme*, there are actually ten fundamentally different relations.[2] In this case, the difference in the relations depends not only on the value of x (which is analyzed as Theme) in the propositional function 'be' F (x) but also on the value of F (which is analyzed as Location) Sentence (a) expresses the relation between an individual and a place, (b) classifies a triangle according to its genus, naming a superordinate class to which all triangles belong; (c) specifies a kinship relation between two individuals, (d) reveals an accidental quality of an entity, in (e), an entity is said to be in the process (activity) of sputtering; (f) describes what is happening to someone, (g) expresses a quantity (age) of a substance, (h) expresses the relation between an event and a time; (i) specifies the emotional state or condition of an individual, (j) expresses the relation between a head cover and a position There may also be other relations that can be expressed by the useful verb 'be' with other entities and/or properties which would also be analyzed as Themes and Locations. The parameters and type of "Location" actually indicate properties by which the types of "Theme" can be seen to differ from each other

[2]The predicate terms in the sentences in 38 above illustrate Aristotle's ten ontological categories. (For more details, see 1 2 2 (ii) and 4.1.3.)

For Gruber and Jackendoff, the examples in sentences 1-34 above provide evidence to show that there exists a single semantic concept that is designated by the term 'Theme', which generalizes across various parameters within each verb class. From this, Jackendoff concludes that this thematic relation is an elementary "conceptual structure" ("the result of the way the mind structures its perception of the world") that determines part of the meaning of each and every sentence of English (Jackendoff 1978: 228).

It seems essential to try and determine the source of the "sameness" that supposedly underlies the notion of *Theme* which is said to recur repeatedly in every sentence of English. In what way can every sentence be said to contain the same element of meaning? What does it mean for relations to be the same? Now since Jackendoff and Gruber describe the thematic relation Theme in terms of entities, e.g., the "moving entity," let us consider similarity between entities. Any two entities are similar because they share the same property or essential properties. To take examples from natural kinds as discussed by Putnam (1975), two tigers are similar because they share the property of being a tiger (and an animal); any two lemons are similar because they share the property of being a lemon (and a citrus fruit) (Putnam 1975: 240, 247-249). Since properties determine classes, and not vice versa, if there is an unlimited class of relations such as Theme, then all Themes must share some property. But being a Theme is not a property that is easy to characterize essentially. In fact, no linguist has, to my knowledge, been able to name a single property that is shared by the infinite class of Themes,[3] nor is there a family resemblance (Wittgenstein 1958: 66-71).

On the basis of the very data presented by Gruber and Jackendoff it seems clear that *Theme* cannot be an "elementary" concept. This is obvious since it appears that the Theme can be characterized in terms of entities which enter into many different relations. For example, a Theme can be any entity that moves, one that is or stays somewhere, one that changes essentially, one that is possessed, one that is said to be involved in a circumstance, but these are entirely different relations that an entity might be involved in. Since a Theme must be present in every situation that is described

[3]Defining Theme by predicate notation, one could write 'Theme= {x | 'x is a ...}' to state a property that is true of members of the class called 'Theme' and only its members.

by sentences of English, it can hardly have only a single semantic criterion. It seems impossible to find one single semantic property or relation that would subsume the 34 general classes of thematic relations that Gruber and Jackendoff distinguish for Theme. In fact, the total class Theme would even contain relations that are complementary. For example, if GO (x) → NOT STAY (x) (Gruber 1976: 62-66), then a moving entity cannot belong to the same class as a staying entity, a changing entity cannot belong to the same class as an unchanging entity, and so on. These are complementary relations.

Basically, it seems fairly clear to me that no single substantive relation such as Theme imposes itself *a priori* on the structure of every sentence in English. Perhaps, as mentioned above, one could say that every sentence of English (or every predication in any natural language) must be about something but this something is surely not restricted to contracting just one possible semantic relation with any verb whatsoever. Although undoubtedly there are constraints (perhaps cognitive, perceptual or real world, as suggested by Gopnik 1981) on the kinds of semantic relations that may be expressed in sentences of natural language, it still seems possible to express a large number of different relations. For each sentence, I would claim, the virtual semantic relations are determined by the intensions and extensions of the subject NPs (their referents) and by the particular properties (expressed by predicates) attributed to the referents of the subjects. Linguistically, the semantic relations that can be expressed in a language are limited, on the one hand, by the finite number of verbs that are available to designate properties or relations, but on the other hand, semantic relations are not restricted to any finite number of entities of different types that can possibly be related in sentences of natural language.

By the same token, the grammar of the language, especially syntax, does impose constraints on the number of grammatical functions that are available for the expression of these semantic relations. For example, for an intransitive verb in English, a single obligatory NP must function as the subject of a declarative sentence. But it is clear that the constraints on the semantics and the syntax of natural language are not parallel. However, since Gruber and Jackendoff are both proponents of a theory in which there is a high correlation between syntactic units and thematic relations (Jackendoff 1972: 5, 14; 1978: 227), it is possible that their thematic analysis of the data is induced by the syntactic

regularities that can be observed. The descriptions of the syntactic facts that correspond to the analyses of Theme are relatively simple. In the examples cited above in 1-34, the NP that is assigned the thematic relation Theme is invariably one that functions as the subject of an intransitive verb or as the direct object of a transitive verb. Thus, the entity that is analyzed as Theme must be designated by an NP that occupies a certain syntactic position, depending on the transitivity of the verb. If the arguments against the notion of a 'structural meaning' for subject-verb, for example, are valid, then it is clear why it is not possible to give a semantic definition that would account precisely for all the subjects of intransitive verbs and all the objects of transitive verbs at the same time. In view of these simple syntactic facts,[4] one could reinterpret the claim that "in every sentence there is a noun phrase functioning as Theme." (Jackendoff 1972: 29). This claim, expressed in logical terms, reduces to the following: Every predicate must have at least one argument.[5] There seems to be no way semantically to interpret the requirement of Theme as suggested by Gruber and Jackendoff. Instead, the only general notion would be that of "the obligatory argument." But this is a syntactic requirement for the wellformedness of sentences and it could be described in purely syntactic terms.

In conclusion, I would say that *Theme* is not apparently an essential semantic concept. That is, this concept does not determine a natural class of entities that share a single property,[6] nor does it determine classes of ordered pairs that enter only into a single semantic relationship. The thematic relation designated by 'Theme' is indeed so general that the assignment of this label to any NP that occurs in a particular syntactic position, especially the subject position of all sentences containing

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[4]Even this simple syntactic definition fails. Every sentence, including complex ones, must have an expression that is assigned a Theme. Consider sentences such as the following, with Theme underlined.

(i) Mary heard from Bill that he wished to see her. ('Bill', Source; 'Mary', Goal)

(ii) The fire marshals instructed the students to remain calm.

[5]In predicate logic, the following propositions are assumed: Every sentence must have a predicate, and every predicate must have at least one subject (Quine 1960a: 344). In the terminology of the theory of relations, this subject is the domain of a one-place predicate or the first co-domain of a two- or three-place predicate. The obligatory argument seems to correlate with the grammatical functions that are obligatory for intransitive and transitive verbs, that is, with subject and object, respectively.

[6]Except for the tautological proposition that all Themes share the property of *being analyzed as Theme*, which is an artifact of the theory.

'be', contributes little, if anything, to the semantic analysis of these sentences. To have succeeded in analyzing a NP that functions as the subject of a categorical sentence as the Theme is to identify it as the obligatory argument. This simple fact is accounted for by any subject-predicate analysis of sentences.

For elementary sentences of the form [NP be XP], the thematic relations Theme and Location would be assigned to the NP that functions as subject and to the XP that functions as the predicate complement, respectively. This means that the NP subject of 'be' corresponds to the obligatory argument or grammatical subject. But what about the XP constituent? Syntactically, both NP and XP are obligatory. That the XP is an obligatory constituent is expressed by the strict subcategorization frame of the verb 'be', and the NP subject constituent is required by the agreement feature of the head of a sentence. It is my contention that the assignment of the general relation Theme to the subject NP adds no information that is significant for the semantic analysis of sentences containing 'be' and that the assignment of a relation of Location to XP is in most cases incorrect, as I shall show in 5.2.2.

5.2 Thematic relations of sentences that are related semantically

In current linguistic literature there is little consensus on the role that thematic relations are expected to play in the grammar. Contrary to the thesis of autonomy for syntax, some linguists claim that certain formal grammatical questions depend crucially on assignments of specific thematic relations. One should indeed expect that the semantic constructs which prove to be essential and adequate for the analysis of single sentences would carry over automatically to the analysis of intersentential relations. In fact, the semantic analysis of single sentences should furnish a basis for the explanation of inference and other semantic relations that hold between sentences. In this section, I will examine some attempts to account for well formed active-passive sentence pairs (5.2.1), for well formed question-answer pairs (5.2.2) and for linguistic inference (5.2.3) in terms of thematic relations. In each section, I will present counterexamples to show that the constructs of thematic relations are irrelevant for explaining these intersentential relations. If the theory of thematic

relations is itself problematic. It seems inevitable that any "explanatory" hypothesis based on it can only be problematic as well. However, it is important to try to discover why an explanation based on thematic relations turns out to be inadequate.

5.2.1 Theme and well formed passives

Jackendoff (1972) attempts to formulate semantic restrictions on rules of passivization (i.e., transformational rules relating active and passive sentences) in terms of a Thematic Hierarchy Condition. This condition has been questioned and shown to fail as a basis for explaining well formed passives in English. (See Gee 1974, Freidin 1975, Hust and Brame 1976). Nevertheless some of Gruber and Jackendoff's observations concerning the passive that are made within the context of the theory of thematic relations still persist in subsequent analyses of the passive.

The analysis of the passive that is assumed by Jackendoff (1972) is a transformational one. The passive sentential phrase marker is derived from an active one by transformational rules. The general transformation known as passivization consists of the following thematic sub-rules. First, either "Agent Postposing" or "Agent Deletion" and then "Theme Preposing" are obligatory for passivization. These transformational rules describe the strict syntactic relations that hold between certain constituents of related active-passive sentence pairs in English. Or, stated in terms of grammatical functions, the object of an active sentence becomes the subject of the corresponding passive sentence. The effects of these rules are illustrated by the following sentences (from Jackendoff 1972: 34-35). The thematic relations, as postulated originally by Gruber and maintained by Jackendoff are Agent (A), Theme (T), Source (S), Goal (G) and Location (L).

1 (a) Fred sold some hashish to Reuben.
A/S T G

(b) Fred sold Reuben some hashish.
A/S G T

(c) Reuben was sold some hashish (by Fred).
G T A/S

(d) Some hashish was sold to Reuben.
T G

According to the theory, transformations do not affect the thematic relations of sentences (Jackendoff 1972: 198). Thus, sentences that are supposed to be related "transformationally" are said to have the same set of thematic relations. Sentences and their transforms are taken as paraphrases. According to Gruber, having the same set of thematic relations is a determining characteristic of "complete paraphrases." Complete paraphrases have the same "prelexical" structures (Gruber 1976: 40-41). In other words, by definition, within the hypothesis of thematic relations, sentences that are interpreted as paraphrases must denote only the same sets of entities, the same relations holding among these entities. On account of this, Gruber and Jackendoff often depend on paraphrases for identifying and justifying the particular thematic relations assigned to expressions in sentences. As mutual entailments, paraphrases express the very same truth conditions and have the very same inferences, as described in 1.2.3. Sentences (c) and (d) illustrate the possibility of generating "Agentless" passives, which are obviously not equivalent to the corresponding active sentences with Agent subjects.[1] These sentences then (although well formed and derived by the rules of passivization) would not count as "complete" paraphrases. For instance, sentence 1 (d) is a consequence of the proposition expressed by the following:

1 (e) The officer sold Reuben some hashish.

Sentence 1 (e) entails (d), but not vice versa. Nor does sentence (d) imply 1 (a)-(c). It does, however, imply the following.

[1] The non-synonymy of active sentences and passive sentences (even when the passives contain an agent 'by'-phrase) is noticed by Chomsky (1957; 1965); Ziff (1966), Keenan (1981), among others. Here are some examples of active-passive pairs which are said to differ in ambiguity, entailments and/or implicatures.

(i) Everyone in this room speaks two languages.
Two languages are spoken by everyone in this room.
(ii) Each student admires no teacher.
No teacher is admired by each student.
(iii) Beavers build dams.
Dams are built by beavers.

These sentences contain quantified, negative, or generic terms. This is not an exhaustive list of features that may determine differences in interpretation for active-passive pairs.

1 (f) Someone sold Reuben some hashish.

These sentences are supposed to indicate an important observation concerning thematic relations. For both active and passive sentences (in fact, for every sentence of English), the NP that is interpreted as Theme is an obligatory argument. Thus, according to the theory, the NP that is interpreted as Agent, or any other thematic relation except Theme, may be omitted from surface structure (Gruber 1976. 208). This observation serves as the basis for another grammatical proposition: the active object NP and passive subject NP must be interpreted as Theme.

An alternative to the transformational analysis of the passive is the "lexical theory" proposed by Bresnan (1982).[2] Bresnan's theory also incorporates the constructs of thematic relations. Her claims concerning thematic relations are similar to those made by Gruber (1976), Jackendoff (1972), Freidin (1975, 1975a, 1978). Bresnan (1982: 24) writes: "Passivization preserves predicate argument structure and hence the original thematic relations of the verb to which it applies." Her lexical rule of passivization would seem to have the very same effects as the transformational rules, although hers is stated in terms of grammatical relations or "functions," e.g., subject (SUBJ), direct object (OBJ) and oblique object (OBL). This rule derives one "lexical form" from another.

2 (a) L ((SUBJ), (OBJ)) →

(b) L ((OBL))/ 0, (SUBJ))

According to Bresnan (1982: 9), "... Passivization changes a transitive lexical form whose subject is agent and whose object is theme to a grammatically intransitive lexical form (... lacking an OBJ function)."

In the remainder of this section, I will examine separately two aspects of this claim: first, the idea that the semantic constructs *Agent* and *Theme* do indeed restrict well formed passives in English,

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[2] A lexical treatment of the passive within generative grammar was first proposed by Freidin. Freidin (1975a: 386) claims that active and passive sentences are "related by a rule of semantic interpretation," not by a syntactic transformation. (This is apparently a return to "pre-transformational" thinking in linguistics, according to Palmer (1974: 82). "It was thought, before the idea of transformation was proposed, that active and passive sentences are related semantically only.")

and second, that the transitive-intransitive dichotomy applies to passivization. In terms of argument structure, I regard the first negatively and the second positively.

First, I wish to show that the thematic relations Agent and Theme do not restrict passives semantically. In the lexical theory, grammatical functions such as subject and object are taken as "universal primitives" but it does not seem that one can maintain the same claim for thematic relations? The construct Agent is apparently not defined semantically, but Theme is defined as "that argument which undergoes the motion or change in state denoted by the predicate." Here Bresnan (1982: 24) cites Gruber (1976), Jackendoff (1976), S. Anderson (1977), Wasow (1980). For Theme, she states that in the unmarked case, it corresponds to the object of transitive verbs and the subject of intransitive verbs, according to Anderson's Theme Rule (Bresnan 1982: 30). ("Anderson's" theme rule was essentially stated by Gruber 1976: 45) Bresnan (1982: 24) notes that while it "is difficult to provide a consistent thematic analysis of all verbs it seems necessary to give "*some* appropriate semantic restriction."

If there is a syntactic relation between active and passive sentence pairs, then it seems to me that the optimal formal statement of the linguistic rules of passivization can only be in syntactic terms. Furthermore, I maintain that semantic roles or thematic relations such as Agent and Theme are a property of sentences (or propositions) and not of lexical entries alone. But, as I shall show, the notions of *Agent* and *Theme* are really irrelevant to the passivization process, especially if they are taken as non-vacuous semantic constructs and the rule of passivization applies to lexical forms. It is easy to find counterexamples to the claim that the NP that functions as subject of the passive can be analyzed as a Theme in all cases and that the NP that functions as the object of 'by' is always analyzed as an Agent. Consider the following sentences in which the NP that functions as the subject of a well formed passive sentence may designate a Source, a Goal, a Location, a Theme, or even an Agent.

3 (a) Fred was robbed of his watch.
S

(b) Reuben was sold some hashish.
G

(c) This chair was sat in by Empress Josephine
L

(d) His watch was stolen
T

(e) Adam was seen selling hashish.[3]
A

As the following counterexamples illustrate, the NP that functions as OBL (the object of the passive 'by'-phrase) may designate an Agent, a Source, a Goal or a Location [4]

4 (a) Our team was beaten by their team
A

(b) The ring was lost by John.
S

(c) Her fortune was inherited by the Church
G

(d) The Cadillac is owned by the mayor.
L

Now if thematic relations are taken as non-vacuous semantic constructs, then it is not the case that the NP that functions as the subject of a passive can always be analyzed as Theme, or the active subject or objects of the 'by'-phrase, as Agent. That is, if we take seriously any claim about a set of discrete thematic relations, then it is clear that a lexical rule of passivization that involves the assignment of only Agent and Theme relations cannot be correct. Thus, apparently the general semantic restrictions

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[3]Some of these "counterexamples" in 3 also pose difficulties for other analyses of passivization. "Dative" or "indirect object" passives (b), "pseudo"-passives (c), and "raising" passives are discussed by Bresnan (1982. ch 1), Davison (1980), and Chomsky (1982), respectively.

[4]I can find no examples of 'by'-phrases that would be interpreted as Theme according to Gruber and Jackendoff's theory. In some analyses of verbs that denote perception or psychological processes, the arguments are interpreted as Stimulus (Theme) and Experiencer (E). (See, e.g., Blansitt 1978: 320; Cook 1979: 56-58). Such active-passive pairs would provide numerous counterexamples. E or T can function as SUBJ or OBJ of different verbs that passivize.

(i) The film amused Seth. Seth was amused by the film.
T E E T

(ii) Beth experienced the same thing. The same thing was experienced by Beth.
E T T E

on passivization are not readily statable in simple terms of thematic relation assignments.[5] The reason for this seems fairly obvious.

The linguistic relationship between active and passive sentences is first and foremost a formal one, which is probably best stated in syntactic terms The basic prerequisite for the active-passive contrast is syntactic. In order to passivize, a verb must be followed by a NP that functions as its direct object This is a syntactic restriction on passivization in English. For active-passive sentence pairs, notice that there is also a strict syntactic link between the NP that functions as the direct object of the active verb and the NP that functions as the subject of the passive sentence. This relation holds regardless of whether the NP is assigned the thematic relation Theme, Source, Goal, Location, etc.

5 (a) John made a car out of wood.
A T/G S

(b) A car was made out of wood by John.

(c) Wood was made a car out of by John (*)

6 (a) John made a block of wood into a car.
A T/S G

(b) A block of wood was made into a car by John

(c) A car was made a block of wood into by John (*)

Whether the NP functions as an active object or as a passive subject, if it is analyzed as a Theme it remains a Theme, an Agent remains an Agent, a Source remains a Source, a Goal remains a Goal, and so on But the syntactic condition applies strictly, irrespective of the assignments of particular thematic relations. Since passivization involves only two specific functional positions, it does not seem reasonable to expect that the subject of a well formed passive could correspond to the same thematic

[5]Other linguists have noticed that various semantic roles (thematic relations) may be assigned to the NP that functions as the subject of a passive sentence. E.g., Dryer (1985) questions the "role of thematic relations in adjectival passives." According to Riddle and Sheintuch (1983: 546), "the single crucial condition on the occurrence of any NP as a passive subject is role prominence. ... All and only NPs whose referent the speaker views as being role prominent (in the situation described by the passive clause) occur as subjects of passive verbs." Other stylistic, thematic (in the sense of *theme-rheme)* or pragmatic restrictions on passivization are suggested by Halliday 1969; Krauthamer 1981; Siewierska 1984; Svartvik 1966.

relation in all cases. And for this very reason, thematic relations (if they are semantic constructs) cannot be defined by syntactic criteria alone, although this has been proposed by some linguists (e.g., Starosta 1978). Such analyses seem to suggest that whatever is denoted by a constituent in a given syntactic position would always hold the same semantic relation with respect to the verb. A purely syntactic hypothesis concerning the assignment of thematic relations would seem to revive the notion of *grammatical* or *structural meaning*. To illustrate this, by the hypothesis of structural meaning, active sentences with transitive verbs, e.g., should always have actor-action-goal patterns. This view has often been criticized (e.g., Lyons 1968: 340-341). Chomsky (1957) explicitly rejects it, countering with the following sentences.

7 (a) John received a letter.

(b) The fighting stopped.

These counterexamples constitute Chomsky's only argument against "the assertion that the grammatical relation subject-verb has the 'structural meaning' actor-action." (1957: 100) If the argument is valid, then it appears that no functional relationship between semantic roles and grammatical relations can be one to one. This fact was the major motivation for the hypotheses of semantic roles or case grammars in the first place. As Fillmore (1968: 25) illustrates, using Agent, Instrument (I), and Location cases,

> ... It is important to notice that none of these cases can be interpreted as matched by the surface-structure relations, subject and object, in any particular language. Thus *John* is A in 29 as much as in 30; *the key* is I in 31 as well as in 32 or 33; ... and *Chicago* is L in both 37 and 38.
>
> 29. John opened the door.
> 30. The door was opened by John.
> 31. The key opened the door.
> 32. John opened the door with a key.
> 33. John used the key to open the door.
> ...
> 37. Chicago is windy.
> 38. It is windy in Chicago.

In any case, by referring to thematic relations, the lexical theory in no way explains the grammatical process of passivization, rather the issue becomes confused. What the hypothesis says is that certain

active lexical forms (with Agent and Theme stipulated for certain grammatical functions) undergo a rule of passivization Other lexical forms do not have their objects labelled 'Theme', therefore, they do not form passives. For example, the following classes of verbs, as a rule, would lack a passive lexical form [6]

8 Symmetrical verbs: 'resemble', 'marry', 'fit', 'match', 'equal', 'kiss', 'meet', 'collide with', etc.[7]

(a) John resembles Bill

(b) Bill is resembled by John (*)

9 Quantity verbs: 'weigh', 'fine', 'cost', 'pay', 'charge', etc

(a) The piano weighs a ton

(b) A ton is weighed by the piano (*)

10 Certain "possessional" verbs: 'have', 'lack', 'want', 'contain', etc [8]

(a) Laurel has a new Corvette

(b) A new Corvette is had by Laurel (*)

11 Certain "relational" verbs: 'become, 'remain', 'be', 'seem', etc.

(a) Mr. Noble became an expert.

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[6]These verb classes are taken from Allerton (1982). He attributes the lack of passive forms to the types of grammatical objects that the verbs take. He considers NPs that denote quantities (9) and NPs that function as predicate complements of the verbs in (11), etc., to be "non-passivizable objects." Allerton (1982: 82) uses the term 'objoids' to refer to the NP objects that are unsuitable as subjects of passive sentences. Besides having no active-passive contrast, Allerton observes that the verbs in these classes also share other properties related to transformations such as lack of "tough movement" and "action nominalization." But Allerton does not specify the properties of the syntactic construct *objoid*. He supplies a name, but not an analysis that solves the problem.

[7]Symmetrical verbs do not occur in passive sentences because the subject and object may be converted with the active verb without changing the relation expressed by the verb. This is just a function of the logical properties of symmetrical verbs.

[8]Some verbs of the same forms as those listed in 8-10 are also used transitively and have corresponding passives, as in the following sentences.

(a) The grocer weighed the turnips.
(b) The teller married Bonnie and Clyde.
(c) The decorator matched the paint to the carpet.
(d) He did kiss Janet's foot.
(e) The tailor fitted the Emperor's new clothes.

(b) An expert was become by Mr. Noble (*)

Now unfortunately a hypothesis based on arguments' being labelled 'Agent' or 'Theme' does not explain why the phrase that functions as the object or predicate complement of these verbs in 8-11 do not count as Themes. In fact, neither does it explain what a Theme is, nor tell us how to predict whether or not a new verb added to the lexicon of English will undergo the rule of passivization Presumably, if it did passivize, then the new verb's object would be said to have the property *Themehood*; if not, then the property is lacking. The essential property of Theme remains a mystery, unless it is simply being the only essential (obligatory) syntactic argument of the sentence, as I concluded in 5.1

What I intended to show here was that the rule of passivization that refers to the thematic relations of arguments as postulated within the "lexical" theory is inadequate as a basis for explaining passivization. It seems clear that to explain the grammatical process of passivization, it is not sufficient to say that the NP that functions as the subject of an active sentence is assigned the thematic relation Agent and the NP that functions as the object is assigned the thematic relation Theme. This part of the lexical hypothesis is incorrect, as I have demonstrated above. But certainly the lexical investigation of the problem of passivization brings to light certain fundamental facts concerning the syntactic relation between active and passive sentences in English.

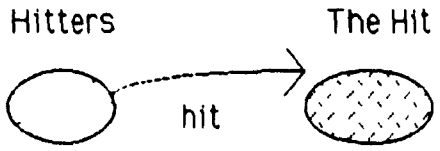
The essential facts may be summarized as follows. An active sentence that corresponds to a passive one must contain a "transitive" verb and at least one NP that functions as the direct object of this verb. This NP is equivalent, being either a token of the same expression or coreferential to the one that functions as the subject of the corresponding passive sentence containing the passive verb forms. In English, the passive verb form is complex, consisting of 'be' plus the past participle of another verb.

In the semantic framework of my thesis, passive sentences in English are conceived as a special case of elementary sentences of the form [NP be XP], where X is a past participle. (See 3.3 for details.) Just in case XP contains a PP introduced by 'by', the so-called "Agent phrase" would be treated as part of (a modification of) the predicate term, which is applied to (predicated of) the

referent of the NP that functions as the subject of the passive sentence.[9] But this does not mean that passive sentences would always be analyzed as monadic propositions.

In 3.3, the extensions of active sentences containing the verb 'hit' are represented in part as a subset of (the Cartesian product of) two sets, or as the ordered referents of the subject and object phrases linked by the relation denoted by 'hit'. The verb 'hit' in its active forms denotes a relation which holds between entities that belong to two types, which may be characterized as 'hitters' and 'the hit'. These types that constitute the relation may be diagrammed as follows.

12



For the interpretation of passive sentences containing this verb, one might refer to the same model, even though the interpretation of the corresponding passive sentence would be different if there were no agent phrase Consider the following sentences

13 (a) Max hit Sally.

(b) Sally was hit by Max.

(c) Sally was hit.

Since the active verb 'hit' signifies a dyadic relation, the proposition expressed by a passive sentence containing 'be + hit' (the past participle being the head of the predicate term) is sometimes also dyadic. In fact, 13 (a)-(b) express dyadic propositions, (c) a monadic one. The extensions of the sentences in 13 would be represented as follows.

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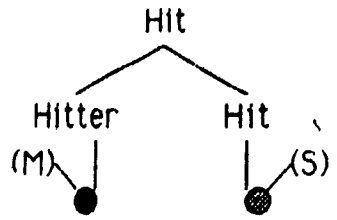
[9]This part of my analysis is consistent with the lexical claim that "passivization changes a transitive lexical form ... to a grammatically intransitive" one (Bresnan 1982: 9). Keenan (1981: 181) proposes an alternative to the transformational and lexical analyses. He argues "that Passive in English ... is a verb phrase derivational rule, not a sentence level one (transformation) and not a strictly lexical level one either. More specifically, he argues "that passive is best treated as a family of rules that derive n-place predicates from n+1-place predicates, subject to certain conditions on semantic interpretation." Hoekstra (1984: ch. 3) presents a historical survey of transformational, lexical and phrasal approaches to the passive. He also redefines transitivity for a verb in terms of the verb's having an externalizable argument.

13 (a)-(b) [NP hit NP]



(c) (S) Hit

For passive sentences, interpreted as special cases of elementary sentences containing 'be', the referent(s) of the subject belong(s) to the type denoted by the predicate term. In my analysis, [be + hit (past participle)] is analyzed as a predicate whose intension determines the type (all entities that are hit). See the diagram for 13 (a)-(b) above. The sentence in 13 (c) simply asserts that Sally belongs to only one of the subtypes that are denoted by the verb 'hit'.

It seems then that the passive predicate 'was hit' only requires the entities that are in the co-domain of the hitting relationship represented in 12. If so, the obligatory argument of a hitting relation is the one who is hit. In this case, the past participle applies to only one set of the ordered pairs in the extension of the active verb 'hit'. I think that Gruber's (1976: 50-52) characterization of the verb 'be' as "momentary" also applies to the passive 'be'. (By this, I do not mean to imply that the active and passive 'be's belong to two distinct lexical items.) In the terminology of Gruber and Jackendoff's analysis of English verbs, one could say that an active sentence describes an "event" while a passive one describes a corresponding "state of affairs" (Jackendoff 1976: 100). The "event" is designated by a sentence containing an active transitive verb in the past tense and its functional arguments. The "state of affairs" that is denoted by a passive sentence in the past tense is a result of the "event" denoted by a corresponding active sentence.

Obviously, an explanatory analysis of passivization must focus on the essential linguistic facts, ignoring accidental and irrelevant ones. The strict subcategorization requires an active "transitive" verb and (passive) participle that is possibly "intransitive." For active-passive sentence pairs, the obligatory argument that functions as the subject of the passive is the same as (or

co-referential with) the object of the active transitive verb. Thus any semantic restrictions on passivization that could be stated within sentence grammar must pertain to the obligatory argument.

Then what is the essential semantic feature that determines wellformedness for passives? For the lexical theory it is essential for the obligatory argument to be assigned the thematic relation Theme. But I have tried to show that conceptually *Theme* has no more content than does the notion of the *obligatory argument*. It may be useful, however, to inquire into the notion of *transitivity* for verbs. Defined syntactically, an English transitive verb has the following strict subcategorization frame [+ ___NP] (Chomsky 1965: 90). In a logical classification of verbs, active transitive verbs are analyzed as two-place predicates. The corresponding passives require only one obligatory argument. That is, the past participle 'hit' may be used intransitively. But this does not mean that the passive predicate designates a monadic property that applies only to the co-domain of a hitting relation. In the unmarked case in English, when there is only one argument it appears in the subject position. Moreover, the obligatory argument corresponds to a logical subject. For conceptual wellformedness, it is a question of the predicability of the predicate that is formed by 'be + past participle' to the referent of the passive subject. That is, the property designated by the "passive" predicate must be applicable to the referent of the subject. This is a matter of the speaker's choosing the predicate that applies to the referent of the obligatory argument. But clearly the question of the semantic restrictions on passivization and the notion of *transitivity* require further study.

5.2.2 Acceptable question-answer pairs

In this section, I will examine the phenomenon of acceptable question and answer sentence pairs, focusing mainly on the general thematic relation Location that is assigned to the predicate complement of 'be'.

Acceptable wh-question and answer sentence pairs are said to involve the same sets of thematic relations (Gruber 1976: 47-49). In English, the wh-question words, i.e., 'who', 'what', 'which', 'when', 'where', etc., are used to request information that is missing and can be supplied only by an

expression that would be assigned the same thematic relation that corresponds to the interrogative word.[1] Gruber uses the question-answer test to verify the thematic relations assigned to sentences of the following type.

1 The circle contains the dot.
L T

which may be paraphrased as follows.

2 The dot is in(side of) the circle.
T L

Since sentences 1 and 2 have the same truth conditions—one could not be true and the other false—they are indeed paraphrases of each other. The thematic relations assigned to the phrases in 2 seem more obviously correct than those assigned in 1. In 2, as Gruber suggests, the preposition 'in' clearly introduces a phrase that should be assigned the thematic relation Location. Therefore, in 1, Gruber would argue, 'the circle' also denotes an entity in terms of which the dot is located. For both sentences, 'the dot' would be conceived as the Theme, i.e., its referent would be the entity whose location is specified. Either sentence might be considered as an appropriate answer to the question.

3 (a) Where is the dot?

Gruber would say that this interrogative sentence requests information about the location of the dot. The interrogative 'where' is used explicitly to ask for its location (Gruber 1976: 47). But sentence 1 could also be the answer to questions such as the following.

3 (b) What does the circle contain?

(c) What is in the circle.

Gruber's analysis seems intuitively correct for sentence pairs concerning the physical location of something. But the analysis does not stop here. As illustrated in 5.1 above, the analysis of physical or

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[1] In the analysis of wh-questions according to the theory of binding, the missing information corresponds to a gap in the sentence. For example,

Q. Your occupation is what?
What is your occupation t?
A. My occupation is ____.

The expression that supplies the information requested by the wh-question word must be assigned the same thematic relation as would be assigned to the rightmost position (filled by a trace left by the moved wh-word).

positional Locations, usually denoted by PPs containing a static preposition, is extended to "abstract" locations as well. For example, so-called "possessional," "identificational," and "circumstantial" Locations are illustrated respectively by the following sentences, where the phrase assigned the thematic relation Location is a NP, an AP, and a VP.

4 The library (L) has the book (T)

5 The guava (T) is tasty (L)

6 The lawn mower (T) is sputtering (L).

Stretching the acceptability criterion a bit, one might even consider 4 to be an acceptable answer to the following question

7 Where is the book?

But 4 would seem to be a better answer for the more explicitly related questions of the following types.

8 (a) Who has the book?

(b) What does the library have?

(c) Where can I find the book?

On the other hand, the question-answer test provides neither assistance nor support for the analysis of the thematic relation Location as assigned in 5 and 6. In fact, as we shall see, this analysis turns out to be highly problematical. The analysis of predicate complements such as 'tasty' and 'sputtering' as a Location is obscure and perplexing. It is not clear in what sense these can be conceived of as locations. For example, 5 is not an acceptable answer to the following question,

9 Where is the guava?

but it is a suitable answer to questions such as the following types.

10 (a) How do you find the guava?

(b) How is the guava?

(c) What is the quality of the guava?

And sentence 6 provides an answer to indirect as well as direct questions of the following types,

11 (a) I wonder what that noise is.

(b) What is the lawn mower doing?

but not to a question such as

*12 Where is the lawn mower?

In English, it seems that the interrogative 'where' asks specifically for a physical location only The most usual response to questions asking "where?" contains the name or description of a place or an entity in terms of which something is located. If there is an elementary concept of *location* underlying the sentences in 5 and 6, then it is surely not the same as the one that is expressed in 1 and 2.

One might respond to my criticism by pointing out that Gruber and Jackendoff would correlate the interrogative 'where' with only one parameter, "positional." This parameter is limited to the field of purely physical locations. Furthermore my criticism fails to recognize the abstract nature of the thematic relations that Gruber postulated in the first place. The individual thematic relations should not be interpreted too "literally." In the works of Gruber and Jackendoff, Theme and Location are defined as general "conceptual structures" having "no direct correspondence with the physical world" but resulting from "the way the mind structures its perception of the world." (Jackendoff 1978: 228). From this perspective, it would be argued that various thematic relations are innately given, and that it is therefore unnecessary to define the constructs of the theory 'Theme' and 'Location'. Sentences of natural language could not be interpreted otherwise, and any theory which did not take thematic relations into account would be not only inadequate but also unnatural.

Nevertheless, it seems important to find linguistic evidence to support the abstract construct Location, which is said to recur repeatedly in different sentence types. How can we be sure that it does recur? As I have argued concerning the thematic relation Theme, it seems that there should be at least one property that holds for each and every occurrence of the relation analyzed as Location. And it does not seem unreasonable, as Gruber suggests, to look for evidence for these underlying concepts in question-answer pairs that speakers say and accept as well formed and sensible. As shown above, Gruber's test does not provide support for every assignment of the relation of Location, e.g., not for 5 and 6. It seems that in every case what is assigned the thematic relation Location should correspond to the question word 'where', as in 1 and 2. Since they designate physical locations, it seems intuitively

correct to associate the thematic relation Location with them and expressions such as 'in the street', 'in London', 'at the races', etc.

Moreover it seems that the relation of location (thematic or ontological) is correctly associated with the entire PP rather than with the NP that functions as the object of the preposition. If the thematic relations were assigned only to the NPs (denoting entities or places), then clearly for some sentence pairs it would not matter which one of the two NPs (in subject position or object of the preposition) would be assigned Theme and which would be assigned Location. For the sentences,

13 (a) The truck is behind the bus.

(b) The bus is in front of the truck.

the theory of thematic relations predicts that the Theme is denoted by the NP that functions as the subject of the verb 'be'. Both sentences in 13 describe the same physical situation, although 'the truck' functions as the grammatical subject of (a) while 'the bus' functions as the grammatical subject of (b). The propositions expressed by (a) and (b) are thus about different entities, and the corresponding questions would be used to inquire about the locations of different entities that play the role of Theme.

14 (a) Where is the truck?

(b) Where is the bus?

The questions inquire specifically into the location of the entities that are denoted by the expressions analyzed as Themes (or the subjects of the most common answers expected). These questions may be answered elliptically as follows.

15 (a) Behind the bus.

(b) In front of the truck

Thus, it is clear that the relation of Location is designated by the entire complex phrase (PP) which specifies the location of one entity with respect to another in these sentences. But the questions in 14 may not be answered by APs or V participles, such as 'rusty' or 'sputtering'.

16 (a) The truck is rusty.

(b) The bus is sputtering.

Even though the statements may be grammatical and acceptable, the sentences in 16 do not answer questions about the location of the truck or the bus. Rather they inform us about an accidental quality of the truck and an "activity" of the bus. They do not say where the bus or the truck is located.

Now the important question is whether expressions of quality and activity predicated of an entity should be taken as or could possibly have the same underlying "conceptual structure" as the physical location of an entity. The theory of thematic relations claims that all of these relations are parallel and determined by the same underlying conceptual structure Location. But this is only a relational notion. It is an analysis of the relation holding between the predicate complement (any predicate complement that belongs to any ontological category) and the verb 'be'. That is, for all sentences containing the verb 'be' the predicate complement is assigned the thematic relation Location while the subject is assigned the thematic relation Theme. But what is the purpose of this assignment of abstract thematic relations? It is clear that these relational notions do not coincide with the fundamental scheme of categorization, such as Aristotle's ontological categories, or Jackendoff's, for that matter.

With respect to the classification of the elements that are related in natural language sentences, the linguistic analysis of question-answer pairs according to the theory of thematic relations gives uneven results. For the analysis of Location pertaining to entities in the physical parameter, the assignment of the thematic relation to the predicate complement seems intuitively acceptable, but not for the analysis of entities in the parameters of possession, identification, or circumstance. If we understand the question word 'where' to request a location, then clearly speakers could not conceive of 'rusty' or 'sputtering' as locations in the same sense as 'behind the bus'. Thematic relations are therefore too abstract for the semantic analysis of categorical sentences. I therefore conclude that not all the things that speakers talk about when they utter categorical sentences are conceived as Themes and Locations.

5.2.3 Linguistic inference relations among sentences

In this section, I will question the value of assigning thematic relations to expressions in sentences to account for possible inference relations among sentences. How would the theory of thematic relations account for sentences which state the logical conclusions that follow from other sentences (premisses)? Inferences are possible because the sentences that function as the premisses and conclusions of logical arguments have the linguistic form they do. That is, so-called "logical" or "linguistic" inferences that are possible are related intrinsically to the structure of well formed sentences of natural language. Inferences are based on the interpretation of individual lexical items contained in the sentences and their structural relations within the sentence grammar of English. Here I am interested primarily in linguistic inferences involving categorical sentences containing the verb 'be'. In addition, I will consider some sentences containing other verbs as well, since these are all ultimately related to categorical sentences.

Within generative grammar, implications and other relations that hold systematically between linguistic units (e.g., lexical items) are generally represented by redundancy rules. In this case, no further statement of these relations is required in individual lexical entries (Jackendoff 1975; Fodor 1977: 150-153). The semantic interpretation of verbs in the context of the theory of thematic relations depends on the concepts underlying the verbs (or rather the general predicates such as CHANGE, BE, etc.) of the system and their mutual relations. Jackendoff (1976) formulates some redundancy rules to account for inference relations among verb classes with shared meaning components. For example, the inference rules from verbs of the CHANGE or GO class to BE verbs are based on the concepts underlying these verbs and are stated in terms of the predicates that appear in the semantic representations of sentences. Among other rules, the following inference rule (taken from Jackendoff 1976: 121-122, 139) relates CHANGE verbs to BE verbs.

1 CHANGE (x,y,z) at t_0 ⊃ for some times t_1 and t_2 such that
$t_1 \leq t_0 \leq t_2$,
BE (x,y) at t_1 and
BE (x,z) at t_2

$\leq$ = earlier than
Conditions: y ⊃ NOT z, z ⊃ NOT y

According to Jackendoff (1976 114), "If something goes from one place to another, it must have been at the first place at some time and at the second place sometime and it was at the first place first" To this inference rule the condition is added that "y and z are distinct places" (Jackendoff 1976 118)

On the basis of this rule, which seems to be valid, presumably some implications between sentences containing verbs of these classes can be worked out automatically Jackendoff (1976) explains "that the implicative properties of verbs are not idiosyncratic meaning postulates or classificatory features but the only possible consequence of the verbs' having the functional structure they do" However, if the elementary predicates are well founded and the inferences suggested are valid, it seems that they should provide a reliable tool for the verification of the representations I will now examine the behaviour of thematic relations with respect to linguistic inferences (Jackendoff 1976 makes no specific claims about thematic relations and these rules)

Just as for paraphrases, one might expect that all sentences related by rules of inference would maintain the same set of thematic relations However, this is not the case Consider the following sentences with respect to inference rule 1 stated above

2 Harry went from New York to Hartford.
T/A S G

3 (a) Harry was in New York at some time, and
T L

(b) Harry was in Hartford at some later time
T L

4 (a) The car started sputtering at time t_1
T G

(b) The car was sputtering at time t_1
T L

5 (a) The metal turned red at time t_1
T G

(b) The metal was red at time t_1
T L

Sentence 2 and sentences 3 (a) and (b) that are entailed by 2 do not share the same set of thematic relations, although there is no denying that the implications hold. One could argue perhaps that the

changes in the assignment of thematic relations are regular and predictable. For example, the Agent-Theme of the CHANGE sentences converts systematically to Theme, and both Sources and Goals, to Locations The same holds for the pairs of sentences in 4-5 But since the same assignment of thematic relations does not hold between pairs of entailing and entailed sentences, it is difficult to see how one could argue for thematic relations on the basis of their contribution to the working out of implications between sentences In fact, it is clear that the specific notions of *Theme*, *Agent*, *Source*, *Goal*, and *Location* are not required for these deductions. Thus, overall in linguistic analysis, the value of working out precisely which thematic relation applies is uncertain. Suppose the definitions of each of the thematic relations were such that absolute deductions would be unquestionable For example, if the following thematic relations were successfully assigned,

6 (a) The children are running → 'The children' is Agent-Theme

(b) The children are hungry → 'The children' is Theme

(c) The children are in school → 'The children' is Theme

what conclusions could one draw from this information that would contribute further to the semantic interpretation of the sentences, much less as concrete deductions? Especially in the case of intransitive verbs, the thematic relation that is assigned to the one and only NP subject seems inconsequential Or, in the case of symmetrical predicates, there must be two logical subjects

7 (a) Mary is acquainted with Bill

(b) Bill is acquainted with Mary

(c) Mary and Bill are acquainted with each other

(d) They are acquainted

Nevertheless, the theory of thematic relations predicts that the Theme is denoted by the NP that functions as the subject of sentences containing 'be'. In this case, the thematic relations can be assigned correctly according to the lexicon, but the value of the assignment is unclear In 7 (a)-(b), the subject is assigned the thematic Theme, the PP complement, the thematic relation Location. Since there are two obligatory arguments, it seems that they could both be conceived as Themes. In the case of

7 (c) and (d), it is not even clear which thematic relations should be assigned. Although there is only one syntactic argument in (d) and two or three in (c), the sentences seem to say the same thing.

It appears therefore that inferential relationships between sentences cannot be based on the thematic relations assigned to argument positions, but that they depend on the intensions of the NPs and the verbs that apply to the referents of the NPs However the implicative relations between the sentences in 2-5 above are determined solely on the basis of the intensions of the verbs they contain.

Next I shall consider inferential relations among a series of sentences containing the verb 'be' Consider the following categorical sentences or elementary predications

8 (a) Don is a Canadian.

(b) Don is my lawyer

(c) My lawyer is a Canadian

(d) A Canadian is my lawyer.

Some of the sentences in 8, in various permutations, form a valid logical argument, i.e , a series of statements of which one (the conclusion, e.g., (c) or (d)) is said to follow from the others (the premisses, (a) and (b)) Certain conditions are necessary for a series of sentences to form a valid logical argument. For instance, the context and the referents in all the sentences must be the same For a fixed context, the proposition expressed by sentence (c) or (d) is implied by the conjunction of (a) and (b) Since the truth of (c) or (d) depends on the truth of (a) and (b), it is impossible for (a) and (b) to be true and (c) or (d) to be false.[2] In the premisses, the properties denoted by 'a Canadian' and 'my lawyer' are attributed to an individual, the referent of the NP 'Don' that functions as the subject of (a) and (b). Although these properties are contingent,[3] the premisses provide conclusive

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[2]The same conditions apply to the other logical arguments in 8; e.g., from ((c) or (d)) and (b), one could conclude (a). For details about the structure of logical arguments, conditions for the truth of conclusions, etc., see, e.g., Copi (1973: ch. 1).

[3]Contingent properties do not hold necessarily (in all contexts) in contrast to necessary or essential properties as in

(i) I saw a tiger.

(ii)(All tigers are animals.)

(iii) Therefore, I saw an animal.

Sentence (ii) need not be stated since being an animal is a necessary property for being a tiger. Putnam (1975: ch. 12) discusses these kinds of properties in detail.

grounds for deducing (c) and (d). Notice that these inferences, like all others, depend solely on the form of the sentences, i.e., on the lexical items contained in the sentences and their structural relations.

In natural language discourse, conclusions such as 8 (c) and (d) "need not be expressed," according to Frege (1892: 61), "as they are contained in the premisses." Although it seems intuitively correct, Frege's observation does not explain how the constituents of natural language sentences convey the logical relations holding between the sentences that serve as premisses and those that serve as conclusions of valid arguments. What is remarkable here is that the expressions that function as predicate terms in the premisses (a) and (b) can also function as the subject of the valid conclusions (c) and (d). Clearly, in order to explain the nature of the relations between the elements of inferentially related sentences, it is necessary as a first step, to formulate precise principles for interpreting the subject-predicate structure of a single elementary sentence containing 'be'.

Now when one attempts to explain the inferential relations among the sentences in 8 using the constructs of thematic relations proposed by Gruber and Jackendoff, it becomes clear that such an analysis is neither descriptively adequate nor explanatory. Consider the following two analyses of the sentences in 8.

9 (a) Don is a Canadian.
T L

(b) Don is my lawyer.
T L

(c) My lawyer is a Canadian.
T L

(d) A Canadian is my lawyer.
T L

10 (a) Don is a Canadian.
T L

(b) Don is my lawyer.
T L

(c) My lawyer is a Canadian.
Location b Location a

(d) A Canadian is my lawyer.
Location a Location b

In 9, each sentence is assigned the pair of thematic relations that is lexically prescribed for all sentences containing the verb 'be'. One would expect that the semantic constructs that are useful in the description of single sentences would carry over automatically to the analysis of intersentential relations. In fact, the semantic description of single sentences should furnish a basis for the explanation of the semantic relations that hold between sentences. But a uniform assignment of thematic relations to all the sentences in 9 makes no differentiation between sentences that serve as premisses and those that serve as conclusions. This means that thematic relations simply cannot contribute to establishing inference rules.

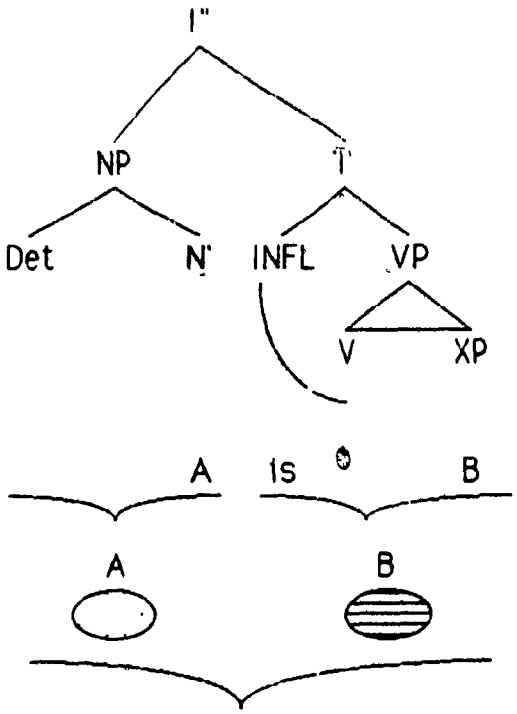
In 10, however, the thematic relations are assigned so as to acknowledge the status of the series of sentences as a logical argument, which is missed by the analysis in 9 But this second analysis is not explanatory either. From sentences (a) and (b), one concludes either that a new Theme or Location a is at Location b or a new Theme or Location b is at Location a. The crucial elements are the terms. The terms stand for the entities that would be analyzed as Themes and Locations. (It is not at all clear why speakers should or how they could make such inferences intuitively Even less clear is why these particular thematic relations are assigned to the phrases that function as subject and predicate terms in (a) and (b) in the first place. In other words, it is the analysis according to the theory of thematic relations that needs to be explained in this case In what way is being a lawyer or being a Canadian conceived as being at a location?)

If speakers indeed interpreted individual sentences according to an assignment of these abstract thematic relations, then the inferential relations among the sentences as a logical argument would be obscured. But speakers do readily understand and accept a series of such sentences as valid logical arguments. As Frege (1892) observes, the conclusions are so intuitively obvious that speakers do not ordinarily state them explicitly. Clearly the theory of thematic relations does not explain the inferential aspect of semantic competence, but the theory is also descriptively inadequate,

since the thematic relations assigned to the functional arguments appear to impede the working out of inferential relations among these sentences.

An alternative analysis of predication is presented in Chapter 3, one which does shed light on the relations between the premisses and conclusions of valid logical arguments. The compositional semantic interpretation of sentences is described there as a process of determining the extensions of linguistic expressions from their intensions. Interpretation takes place at three levels of sentence structure in this order: lexical, phrasal and sentential. The rules of semantic interpretation operate on phrase markers from the bottom to the top of the tree diagram. Intensions are assigned to each terminal element (lexical items) and then these are combined at the phrasal nodes, e.g., [NP,VP], [VP,I'], and so on, until an interpretation is assigned to the whole sentence. Sentences of the form [NP be XP] are interpreted by this procedure. According to this hypothesis, the terms of the subjects and predicates of sentences containing 'be' are interpreted as referents and ontological types, respectively; for the interpretation of the whole sentence, the referent of the subject is conceived as belonging to two ontological types. The extensions of the subject and predicate phrases are illustrated in 11

11



An affirmative declarative sentence of the form [$_{I}$-NP be XP] is interpreted as follows: The referent(s) of [NP,I"] belong(s) to the ontological type(s) denoted by [XP, [$_{V}$-be]]. This rule accounts for the general semantic relation that corresponds to the grammatical subject-predicate relation for sentences containing 'be'. The extension of the whole sentence may be diagrammed as follows.

12 (A) B

This diagram illustrates what the world would be like if any sentence containing 'be' described by the rule were true. In terms of truth, a sentence of this form would be true only if the referent(s) of the subject belonged to the type(s) denoted by the predicate term. Also illustrated here is the principle that, for a true categorical sentence, anything that is said to belong to type A also belongs to the type B, or (all) a's are b. If the referent of the subject belongs to two ontological types, then it may be referred to as either an 'a' or as a 'b' That is, if the statement 'A is B' is true, then the expression 'B' is semantically substitutable for the expression 'A' in a given logical argument. This fundamental principle accounts in part for the inferential relations that hold between the premisses and conclusions in 8. It is discussed by Sommers (1982) as a special case of the *dictum de omni*.

In contrast to the theory of thematic relations, the categorical approach based on ontological types and categories makes the inferential relations evident. The main advantage of this approach is that it makes modest claims which are realistic. The linguistic information required is limited to the intensions and extensions of lexical items and phrases and their structural relations. The intension contains criterial information concerning the type of entity that the expression denotes. Thus the processes of conceptualization and interpretation are directed toward an extramental world of discourse. The data involving both questions and inferences suggest that such an ontological classification is more expedient for explaining interpretive phenomena than the abstract constructs of thematic relations, which are language centered, specifically depending on the structure of a single sentence containing a particular verb. That is, thematic relations are designed for and restricted to

single sentences, and their interest seems to stop there. As illustrated above, no inferences or implications between sentences are stated or analyzed in terms of thematic relations.

The main problem for the theory of thematic relations is seemingly that it claims too much. It ascribes to speakers certain innate conceptual structures that are not required for the interpretation of single sentences. Like theories of pragmatics, the theory of thematic relations presupposes the intensions and extensions of verbs and their functional arguments. But in addition to the ordinary intensions of NPs, for example, the theory of thematic relations also postulates the property of being the Theme or being a Location, which is assigned to the functional arguments of verbs in a sentence.

The kind of conceptual information that is appropriate for the analysis of sentences should also be valid for explaining relations among sentences. Now consider the assignment of thematic relations to the subject phrases of these sentences.

13 (a) My cousin (T) is a bachelor.

(b) Someone (T) is a bachelor

14 (a) Her dress (T) is torn.

(b) Something (T) is torn.

In this case, the thematic relations are simply irrelevant to the conceptual analysis that is involved in implicative relations between the (a) and (b) sentences. For example, from 13 (a) one can infer 13 (b) and from 14 (a), one can infer 14 (b). But 'my cousin' and 'her dress' are assigned the same thematic relation Theme. Yet the implications are different. From 'my cousin' one derives 'someone', while from 'her dress' one derives 'something'. Clearly these implications are not based on the sentential relation Theme, but rather they involve a classification that is ontologically oriented. That is an analysis of the nature of a thing or what it is essentially. This is exactly the kind of classification exemplified by Aristotle's ontological categories, which can be taken as a classification of the things that speakers talk about.

To verify that the copying process of assigning thematic relations labels to the functional arguments of 'be' is insufficient for the semantic interpretation of natural language sentences, consider the following example containing nonce words. From the determiners, we can deduce that this is a sentence of the form [NP be NP].

15 (a) The nola is an eagen.
T L

Even though thematic relations have been assigned to the functional arguments (NPs), I doubt that any competent speaker of English could say very much about the meaning of 15 on that account. From the thematic relations, the only conclusions are that 'the nola' is assigned Theme and 'an eagen' is assigned as Location. But according to traditional assumptions, a speaker who could interpret 15 would be able to understand the proposition it expresses and would know what the world would be like if it were true. And furthermore, general implications such as

16 Something/someone is/isn't a physical object.

could at least be drawn, if one only knew the intensions of 'nola' and 'eagen'. No inferences or implications follow because the NPs cannot be interpreted. In this respect, the categorical approach can do no better because it depends explicitly upon the intensions of the lexical items that are analyzed as terms. Both analyses clearly depend only upon the conceptual information conveyed by the lexical items and their relations within sentence structure. Just the same, the categorical method is preferable. Ontological types and categories seem to be more relevant for working out inferences between sentences than abstract constructs such as thematic relations because types and categories are closely connected to the inherent properties of the entities that speakers talk about and what they attribute to them.

Summary

My objective in this dissertation has been to propose a semantic analysis of subject-predicate relations that will serve as a basis for explaining how competent speakers of English can interpret elementary sentences containing the verb 'be' Although I do not consider the relational notions of *subject* and *predicate* to be syntactic primitives (as explained in 1 2 1), they can be useful heuristics for semantic analysis. Subject and predicate are factored here into more elementary syntactic and semantic constituents. The preceding chapters have been concerned with the analysis of the basic units of syntactic structure and the corresponding units of conceptual structure of the subject and predicate phrases in categorical sentences The main task was to propose principles or correspondence rules by which the structural units and the conceptual units of categorical sentences could be correlated For this task, I have given special attention to the structural and conceptual characterization of 'be'

The syntactic notions and principles that I take to be essential for an adequate description of the subject-predicate relations of categorical sentences are described in Chapter 2. The grammatical principles that are necessary to account for the well-formedness of elementary sentences include those of X-bar syntax and the Projection Principle based on inherent lexical properties and strict subcategorization I argue that strict subcategorization furnishes a better base for the Projection Principle than the θ-Criterion since the latter does not account for the complementation requirements of verbs such as 'be' I claim that a verb's subcategorization is an important part of a speaker's syntactic competence That is, a competent speaker who chooses a particular verb knows the category of the phrase(s) that it governs. This proposal contrasts with previous analyses of predication within generative grammar. For example, Rothstein's rule of predicate linking (1983) is supposed to account generally for the well-formedness of sentences, making a specific phrase structure rule for the analysis of sentences redundant. However, her definition of subjects and predicates is based on the assignment of θ-roles to subjects. Thus her rule of predicate linking is inadequate since it cannot account for the ungrammaticality of the following sequence: 'It is ___' (*). (See 2 1.2 for details)

For the description of the syntactic part of the structure, the following labelled bracketing represents the D-structural analysis of elementary sentences containing 'be'. $[_{I}$-NP$[_{I}$-INFL$[_{VP}$be XP]]]. A sentence is the maximal projection of the INFL category, which in English is a [+finite] V position. Sentences containing a finite form of 'be' have the following S-structure: $[_{I}$-NP .. $[_{INFL}$be$[_{VP}$t XP]]]. The terms 'subject' and 'predicate' refer to phrases of particular categories in particular configurations. They are defined in this work as follows. Subject. [NP,I"] and Predicate [VP,I']. In 1.2.2, I argue for an analysis of 'be' as one lexeme categorized as a full verb (V). The following represents the categorization and subcategorization frame of 'be'.

1 'be': [+V,-N, +____XP], where X may be N, A, P, or V

Predicate complements of these categories are illustrated in 2

2 (a) This is Pat; (b) he is not a bachelor [NP be NP]

(c) He is married. [NP be AP]

(d) A man was in the kitchen. [NP be PP]

(e) All of the cookies have been eaten. [NP be VP]

Thus I would analyze 'be' as a single lexical item in the grammar of contemporary English. My main argument here is a uniform syntactic and semantic analysis of 'be' as described in Chapters 2 and 3 This analysis unifies all syntactic functions (e.g., auxiliary, copula, main verb, as outlined in 2.2) and all "senses" of 'be' (e.g., definitional, equative, existential, predicative, etc., as discussed in Chapter 4).

For the description of the semantic part of the structure, two questions are considered basic: What information is conveyed by expressions of language? and What is this information about? (Jackendoff 1983: 23). I conclude that language conveys conceptual information about entities of various types that speakers talk about in an extramental world of discourse. My semantic analysis reflects ideas from several different sources. In 1.2.2, I examine the issue of the ontological relationship between language, mind, and reality, as viewed by (i) classical semanticists and logicians, e.g., Carnap, Frege, Putnam; (ii) Aristotle and traditional logicians, e.g., Sommers; and (iii) conceptualists, e.g., Jackendoff (1983). As a starting point, I adopt a Chomskyan theory of

grammar, which is mentalist, and Jackendoff's conceptual structure hypothesis. (See 1.1.) My ontological position, which is basically Aristotelian, is summarized in 1.2.2 (iv). I conclude that for linguistic semantic analysis, what needs to be accounted for is intensional, i.e., what is said, rather than what is actually in the world of discourse. (In an Aristotelian approach, both aspects would be analyzed according to the same concepts.) Next, I will summarize my observations concerning the conceptual information that is essential for the interpretation of sentences containing 'be'.

A single correspondence rule for the interpretation of categorical sentences in English is proposed in Chapter 3. This rule purports to account for the subject-predicate relations of all elementary sentences containing 'be'. Also I try to justify the use of the same verb in all the sentence types illustrated in 2 above and to explain why elementary sentences containing 'be' are basic. 'Be' in English is an explicit sign of attribution. The propositional content of elementary sentences containing 'be' is the attribution of an ontological type to the referent(s) of the subject NP. An affirmative declarative sentence analyzed as [$_{\iota}$-NP be XP] is interpreted or analyzed extensionally as follows: the referent of [NP,ι"] belongs to the type denoted by [XP, [$_{\lambda}$-be]]. This rule is stated in terms of the conceptual analysis of the verb. Thus it encapsulates the contribution of 'be' to the truth conditions of categorical sentences and suggests conceptual well-formedness conditions for these sentence types.

Compositional semantic interpretation is described here as a process of determining the extensions of linguistic expressions. The extensions of categorematic expressions are determined conceptually by their intensions. The intension of an expression is basically the information that the expression conveys (or the concepts that correspond to it), while the extension is what the information is about. For linguistic semantic interpretation, what is said (expressions in a certain syntactic configuration with corresponding intensions) is taken as a point of departure. I characterize the extensions of lexical items, phrases, and sentences in terms of the entities speakers intend to talk about (i.e., the referent(s) of expressions) and the ontological types the referents are said to belong to. Using the basic notions of *referent, entity* and *type*, I show how the interpretations of lexical items, phrases, and sentences differ from each other, and how the extension of a complex expression is determined by the concepts corresponding to the smallest constituents of the sentence, the lexical items

it contains. Interpretation as described in Chapter 3 is a process that is truly compositional, which is not demonstrated often in the literature of generative grammar.

The subject and predicate phrases each contain a constituent that functions as a term. For my semantic analysis, the notion of *term* is central. It comes from Aristotelian "two-term" logic (TFL), as described in 1.2.1 and 1.2.2 (ii). In well formed categorical sentences, there are always two terms that are related by the verb 'be'. A term is a categorematic expression that belongs to an ontological category or type, as discussed in connection with Aristotle's metaphysics. As in Aristotelian logic, I assume that ontological types have an intensional (mental) aspect and an extensional (extramental) one. Well formed sentences containing 'be' determine a situation in a given world of discourse in which the referent(s) of the subject belong(s) to the type(s) denoted by the predicate term. But according to TFL, there is no need to distinguish between the subject and predicate terms on the basis of semantic criteria, as observed by Sommers (1982). Both terms correspond to ontological types. This is one advantage of a semantic analysis based on the principles of TFL. The same principles of interpretation apply to any categorematic expression that functions as a term whether it appears in the subject or the predicate. For instance, for sentences of the form [NP be NP], the two NPs would be interpreted according to the same compositional principles. The distinction between the functions of the subject and predicate NPs depends upon their asymmetrical dominance relations within sentence structure. That is, the NP that is a sister to (governed by) the verb 'be' is predicated of the referent(s) of the subject NP.

Although 'be' is analyzed as an explicit sign of attribution, which is characterized conceptually as a relation between two terms, sentences containing 'be' are not interpreted in the same way as sentences containing verbs that are analyzed as two-place relations. These two claims are apparently incoherent or at least require an explanation. In sections 3.2 and 3.3, I compare and contrast the interpretation of sentences containing the verbs 'hit' and 'be' in the same inflectional forms. Although sentences of the forms [NP hit NP] and [NP be XP] may contain exactly the same number of expressions that correspond to the same number of concepts, all sentences containing 'hit' express or imply dyadic propositions, while many containing 'be' express monadic propositions. The

main distinction between monadic propositions expressed by sentences containing 'be' and dyadic propositions is extensional. The function that is designated by 'hit' applies to the referents of both the subject and the direct object phrases in sentences. In categorical sentences, the type that is designated by [be + XP] is attributed only to the referent(s) of the subject phrase.

For every elementary sentence, the conceptual relation of attribution is signified by the combination of subject and predicate phrases. In every well formed sentence (containing 'be' or any other verb), the predicate is attributed to the referent(s) of the subject phrase. Whatever is designated by the whole predicate phrase is attributed to the referent(s) of the subject phrase. The verbs 'be' and 'hit' differ, however, in their semantic content. I have characterized 'hit' as categorematic, and 'be', as syncategorematic. The contribution of 'be' on its own to the meaning of the sentence is the following. It asserts only that the referent(s) of the subject belong to a certain type or types, which it does not designate itself, whereas 'hit' asserts that the referents of both the subject and direct object phrases belong to a relational type, which it designates itself. 'Hit' designates an action (activity or process) involving two referents or two sets of referents. This happening may be characterized as a relation of contact. On its own, 'be' does not designate the type to which the referent(s) are said to belong. The ontological type to which the referent(s) is/are said to belong in categorical sentences is designated by [be + XP]. (For details, see Chapter 3.)

As a consequence of the categorical analysis of 'be', in well formed sentences, it is clear that the type denoted by the predicate XP must be extensionally equal to or more comprehensive than that denoted by the subject NP. Only in case X is N could the extensions of the subject NP and predicate term be equal. Thus [NP be NP] is the form required for sentences analyzed as identity statements. Although subjects and predicate complements may be extensionally equivalent, when different expressions are used, they are rarely, if ever, intensionally equivalent. (For this reason, I reject the coindexing procedures for the syntactic analysis of predication, which imply that subjects and predicates are coreferential. See 2.1.1 and 4.2 for details.)

In the course of this study, I have examined several different approaches to the semantics of categorical sentences. In Chapter 4, I contrasted my conceptual analysis of 'be' as the relation of

attribution with other specific semantic analyses of 'be' In particular, I considered Aristotle's ten-way classification based on his theory of categories and the four-way analysis of 'be' as "existential," "equative," "predicative," and "veridical" (4 1 and 4 2) and Williams' (1984) distinction between 'be' Aux and 'be' V in terms of the notion of *intentionality* (4 3) The different senses that are attributed to 'be' are often the contributions to sentence meaning of the various subject and predicate terms Therefore these are not veritable conceptual analyses of the verb 'be' itself

As a consequence of my compositional analysis of categorical sentences, it is possible to indicate the functions of constituents of various syntactic categories in the expression of categorization and individuation judgments. Categorization, which is prior, is the process of classifying or determining that an entity belongs to one type or another Individuation is a process for distinguishing entities of a certain type For the expression of a categorization judgment, a phrase of any major category can be used to designate a type All categorematic lexical items of natural language correspond to type concepts For the expression of individuation, a determiner or quantifier (explicit or implicit) is required Thus, only NPs are individuating expressions as they are the only categories that contain determiners In *Semantics and cognition* (1983), Jackendoff posits two different kinds of conceptual constituents, which he distinguishes as "TYPES" and "TOKENS," to account for the cognitive processes of categorization and individuation Unlike Jackendoff, I do not posit "token" concepts, only "types."

The consequences of my categorical analysis contrast with those of Jackendoff's (1983) proposal. I agree with his claims only in part. (For details, see 1.2.2 and 1 3 1.) Jackendoff describes two supposedly innate conceptual schemes by which human beings organize and interpret their experience in the world: a scheme of ontological categories and a scheme of thematic relations Although I completely agree with his scheme of ontological categories, which is quite similar to Aristotle's (see 1.2.2 (11)), I do not subscribe to the thematic relations hypothesis. In Chapter 5, I consider data involving various intersentential relations, comparing and contrasting the results based on thematic relations assignments and my extensional categorical analysis. These data include active-passive sentence pairs, question and answer pairs, and inferentially related sentences. While the

assignment of thematic relations often fails to account for these relations, the categorical approach based on Aristotelian logic does better The conceptual analysis of expressions based on ontological types involves information by which the speaker conceives of the things referred to in the world of discourse according to their properties. On the other hand, the thematic relations Theme and Location (which are invariably assigned to subjects and predicate complements of sentences containing 'be') involve (lexical) relations that are restricted to isolated sentences. The data involving questions and inferences suggest that an ontological classification is more expedient for explaining interpretive phenomena than the abstract constructs of thematic relations which are wholly conceptual and closely allied to syntactic structure (See 5 1) Crucially, I find no inferences or implications between sentences that depend on the assignment of specific thematic relations (For details, see 5 2.3) In contrast, the extensional interpretation based on referents and ontological types makes the inferential relations immediately evident The main advantage of my approach is that it makes modest claims which are realistic The conceptual information required is limited to the intensions of lexical items and their structural relations in sentences The intension contains criterial information concerning the type of entity that an expression denotes I conclude that both the processes of conceptualization and interpretation are directed toward an extramental world of discourse

In this work, I have argued that the entities that speakers can refer to and talk about do not belong to a single ontological type. It is also questionable that there is a single ontological category (such as a category of being, essence, or substance, as suggested by Aristotle) which would subsume all types of entities that are the objects of linguistic reference. I have not attempted to delimit the types of nameable entities that speakers can refer to and talk about If there were indeed a basic ontological category such as substance (that subsumes all subject terms) we might say that it can be subdivided into several different types which may be identified by more specific characteristics.. In this work, I have mentioned at least four distinct types that have significance for linguistic analysis. First, there are those entities that are denoted by count nouns, second, non-count nouns (including abstract terms and mass terms). Third, on the basis of pronouns, we can distinguish two types in English (and many other languages as well): human and non-human entities. And fourth, on the basis

of question phrases, other categories of subject and predicate terms are confirmed, such as qualities (what kind?), quantities (how much/many), locations (where?), actions, activities, processes, happenings, etc (what . going on?), and so on What other kinds of referents are there? By what semantic characteristics are the types denoted by count nouns distinguished from those denoted by mass nouns or abstract nouns? These and other questions remain to be answered in future research In any case, it seems clear that the general ontological categories identified by Aristotle are pertinent as a starting point for linguistic analysis

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