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SEMANTIC THEORY AND THE MEANING OF 'GOOD' *

DIFFICULTIES in reaching a successful formulation of the meaning of philosophically significant words are often attributed to the alleged incongruities and amorphousness of natural languages. There is another explanation, however, namely that such difficulties result from relying on one or another inadequate conception of what constitutes a description of the meaning of a word. On this explanation, the alleged incongruities and amorphousness of natural languages are merely artifacts, due to use of inadequate descriptive tools.

This paper adopts the latter explanation. It seeks to support it in the only way possible: by providing an adequate formulation of the meaning of a philosophically significant word within the framework of the kind of semantic theory that affords an acceptable conception of the description of the meaning of a word. We choose the English word 'good' as our test case because the difficulties encountered in previous attempts to describe its meaning are at least as severe as those encountered in connection with any other philosophically significant word.

The thesis of this paper is, then, that the semantic structure of a natural language is highly systematic, but that only a certain kind of semantic theory can reveal this systematicity. To establish this thesis, we first present the kind of semantic theory that can provide an adequate conception of the meaning of a word. Then, we examine the main facts about the meaning of 'good' and offer a formulation of this meaning within such a semantic theory. Finally, we consider some reasons why other kinds of semantic theories cannot provide an acceptable account of the meaning of 'good' and then consider certain philosophical implications of our account.

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*The Nature of a Semantic Theory*¹

A description of a natural language is a scientific theory in the form of a system of rules from which the phonological, syntactic, and semantic facts about the language can be derived as consequences.² The *phonological* rules in a theory of English reconstruct the principles underlying a fluent English speaker's ability to differentiate the sounds of English from those of other languages, such as Russian, French, Chinese, Bantu, etc., whereas the *syntactic* rules reconstruct the principles underlying his ability to identify the words of an English sentence, determine their syntactic categories, find out how strings of words are related, and discover the pattern of construction on which a sentence is built up from its constituent words. Nothing further need be said here about the phonological rules except that it is a fluent speaker's knowledge of these rules that helps him to identify a continuous flow of speech sounds as an instance of a particular sequence of discrete phonetic elements.³ The syntactic rules segment such sequences of phonetic elements into sequences of minimal syntactically functioning units (which for simplicity will be taken to be words) and provide a description of their syntactic structure. We shall here suppose that such a description is given in the form of a labeled bracketing of the sequence of words, in which each distinct syntactic constituent is bracketed separately and every syntactic constituent of the same type is labeled in the same way, so that identically labeled constituents are classified as belonging to the same syntactic category. For example:⁴

$((((the)_{Art}(child)_N)_{NP}(((Pres.)_{Tns})_{Aux}(likes)_{V_{tr}})_{MV}((hard)_A(candy)_N)_{NP})_{VP})_S$

¹ The conception of a semantic theory to be developed in this section was first published in J. J. Katz and J. A. Fodor, "The Structure of a Semantic Theory," *Language*, 39, 2 (April-June, 1963): 170-210. It was further developed in my "Analyticity and Contradiction in Natural Language," in *The Structure of Language: Readings in the Philosophy of Language*, Fodor and Katz, eds. (Englewood Cliffs, N.J.: Prentice-Hall, 1964); and in J. J. Katz and P. Postal, *An Integrated Theory of Linguistic Descriptions* (Cambridge, Mass.: MIT Press, 1964).

² For further discussion, cf. Katz and Postal, *op. cit.*

³ For a discussion, cf. M. Halle, "The Strategy of Phonemics," *Word*, 10, 2-3 (August-December, 1954): 197-209.

⁴ It is, of course, not strictly true that such diagrams provide the full syntactic analysis of sentences. But it is close enough for our purposes. Cf. N. Chomsky, *Syntactic Structures* (S'Gravenhage, The Hague: Mouton & Co., 1957) or "A Transformational Approach to Syntax," in *The Structure of Language: Readings in the Philosophy of Language*, for some idea of what such diagrams leave out. We shall employ the following abbreviations here and throughout this paper: 'S' for 'sentence', 'NP' for 'noun phrase', 'VP' for 'verb phrase', 'N' for 'noun', 'Art' for 'article', 'Aux' for 'auxiliary', 'Tns' for 'tense', 'Pred' for 'predicate', 'MV' for 'main verb', 'A' for 'adjective', 'Adv' for 'adverb', 'C' for 'conjunction', 'Interj' for 'interjection', 'V_{tr}' for 'transitive verb', and 'V_{intr}' for 'intransitive verb'.

The *semantic* rules reconstruct the speaker's ability to obtain a conceptual interpretation for the abstract, formal structures represented by descriptions such as the diagram above. The tripartite character of a linguistic description reflects the fundamental fact that a language is a form of communication in which a highly (syntactically) structured set of (phonologically) determined objects serve as vehicles for transmitting (meaningful) messages from speaker to hearer.

If a person had a knowledge only of the phonological and syntactic structure of English, its sentences would seem to him much like lines of Lewis Carroll's "Jabberwocky." Since the sentences of a speaker's language are not heard as lines of "Jabberwocky," a semantic theory for English—or any other language—must reconstruct the principles underlying the speaker's ability to comprehend the meaning of sentences. But these principles enable the speaker to perform a rather remarkable feat. They permit him to understand sentences he never previously encountered. So ubiquitous and commonplace is this feat that its theoretical significance is often overlooked. The very fact that almost every sentence we hear or speak is heard or spoken for the first time keeps us from noticing just how amazing it is that a speaker can understand new sentences. But if we think about the learning of a foreign language, the theoretical significance of this feat becomes apparent immediately. For we do not credit a person with mastery of a foreign language if he is able to understand only those sentences whose meaning he has already learned. Rather, the criterion of fluency is whether or not he can understand sentences that are wholly new to him. Since the significance of the feat of understanding novel sentences is that the ability to perform it is the criterion of fluency, a semantic theory must explain the nature of this ability. It must reconstruct the principles that enable fluent speakers to communicate novel thoughts in novel forms of language.

The reconstruction of these principles is a step of theoretical inference. In the manner of a scientist confronted with the observable effects of some observationally inaccessible mechanism, we construct a model that accounts for the available linguistic evidence. If the model has the right properties, it will enable us to predict the future linguistic behavior of speakers and explain general facts of linguistic communication. Such success allows us to attribute the structure of our model to the mechanisms inside the speaker's head and then claim that this structure represents the structure of the observationally inaccessible linguistic mechanism.

The kind of semantic theory to be presented in this section explains how a speaker is able to understand novel sentences, by attributing to him a system of semantic rules whose applications

provide a meaning for *every* sentence of his language. If this system of semantic rules does assign the correct meaning to every sentence, then, *a fortiori*, a speaker's possession of such a system accounts for his ability to grasp the meaning of a sentence he encounters for the first time.

Our conception of a semantic theory is based on the idea that, if a speaker is to be able to assign a meaning to every sentence of his language, the principles he uses must obtain the meaning of a compound construction as a compositional function of the meanings of its constituent parts. Thus, the rules of a semantic theory that are to reconstruct these principles must apply first to the meanings of the lowest-order constituents in a sentence, and then, by further applications, produce, by combining meanings, a meaning for each compound sentential constituent, up to and including the whole sentence itself. From this it follows that the semantic rules operate on the members of the set of sequences of words that the syntactic rules describe as well-formed sentences, together with the syntactic descriptions of them. Thus, we may think of the semantic rules as receiving their input from the syntactic rules in the form of abstract, formal structures such as that depicted in the diagram above. The output of the semantic rules will be some sort of characterization of the meaning of each of the syntactic structures received as input. Just what sort of characterization this is will be determined by the kind of data such rules have to predict and explain.

Since the compositional construction of meanings is a function of the syntactic structure of sentences, this construction must start with the meanings of the elements that are taken as atomic in syntactic descriptions, i.e., with the words. Hence, the semantic rules must include a *dictionary* in which each word of the language is associated with a representation of its meaning. Also, these rules must include what we may refer to as *projection rules*, which provide the combinatorial machinery for projecting the meaning of a sentence and its compound constituents from the meanings of its words. We shall refer to the result of applying the dictionary and projection rules to a description of the syntax of a sentence as a *semantic interpretation*.

Although the words are atomic elements from the syntactic viewpoint, their meanings are not indivisible entities, but are constituted of semantic elements in relation to one another. The job of a *dictionary entry* is to represent this semantic structure. Accordingly, a dictionary is a finite list of dictionary entries, one for each word in the language. A dictionary entry consists of a word paired with a representation of its meaning that includes every piece of information required for the projection rules to operate properly. The form of such a representation is as fol-

lows: n distinct sequences of symbols, called *readings* (of the word in whose dictionary entry they appear), each sequence consisting of an initial sequence of syntactic markers, followed by a sequence of symbols which we will refer to as *semantic markers*, and, terminally, by a symbol which we will refer to as a *selection restriction*. Each reading represents the semantic structure of a sense of a word, for just as the meaning of a word is not an undifferentiated whole, neither is a sense of a word. A dictionary entry for the word 'bachelor' might be as follows:

- bachelor* → (1) N, N_1, \dots, N_k ; (Physical Object), (Living), (Human), (Adult), (Male), (Never-married); <SR>.
 (2) N, N_1, \dots, N_k ; (Physical Object), (Living), (Human), (Youth), (Knight), (Serving under the standard of another); <SR>.
 (3) N, N_1, \dots, N_k ; (Physical Object), (Living), (Human), (Having academic degree for completion of four years college); <SR>.
 (4) N, N_1, \dots, N_k ; (Physical Object), (Living), (Animal), (Male), (Seal), (Without a mate at breeding time); <SR>.

Semantic markers are enclosed within parentheses to distinguish them from syntactic markers, in the above example, N, N_1, \dots, N_k . Selection restrictions are enclosed in angles. Since each reading represents a distinct sense, a word with n readings in its dictionary entry is n -ways semantically ambiguous. 'Bachelor', for example, is marked as 4-ways semantically ambiguous in the dictionary entry above.

A reading provides an analysis of the semantic structure of a sense which decomposes that structure into its elements and their interrelations. Semantic markers represent the conceptual elements out of which the sense of a word is constituted. They not only provide a semantic theory with the theoretical constructs it needs to formulate readings that correctly analyze the semantic structure of senses; they also make it possible to construct generalizations about the meanings of words. For example, inclusion of the semantic marker (Male) in the readings for such words as *uncle, man, priest, he, bachelor, gander, husband, brother, boy*, etc. expresses the semantic generalization that these words are conceptually similar in this respect, and the absence of this semantic marker from the readings for such words as *truth, wife, cause, bundle, fly, army, classmate, cousin, girl, philosopher*, etc. expresses the fact that these words are not conceptually similar in this respect, either to one another or to any of those words in the previous list. The extreme case of semantic similarity, the case where two words have the same meaning, i.e., are synonymous, can be represented by having their readings contain exactly the same semantic markers. Difference in meaning can be represented by differences in one or more semantic markers. In gen-

eral, the formulation of semantic generalizations is a matter of constructing readings to have just the semantic markers necessary to formally mark the semantic relatedness among a set of words or expressions.

It is important to stress the fact that, although semantic markers are given in the orthography of a natural language, they cannot be identified with words or expressions of the language that is employed to give them suggestive labels. Rather, they are to be regarded as constructs of a linguistic theory in just the sense in which terms like 'force', 'mass', 'molecule', etc. are accepted as labels for scientific constructs in physical theory. There is here a strong analogy between the manner in which a reading for a sense of a word or expression represents its structure of concepts and their interrelations and the manner in which a chemical formula for a molecule of a substance represents its structure of atoms and the bonds between them. Both employ theoretical constructs of a scientific theory and a schema of representation to exhibit the elements and relations out of which a compound entity is formed.

Because the projection rules construct readings for syntactically compound constituents from the readings of their words, the notion of a reading has an extension greater than that of the set of words of the language. It designates not only representations of senses of words but also representations of senses of expressions of any sort: phrases, clauses, and so on, up to and including sentences. We may distinguish between *lexical readings* and *derived readings*, but 'reading' will be used to cover both. The notion of a reading of a word or sequence of words less than a full sentence is intended as an explication of the philosopher's notion of a concept; that of a reading for a full declarative sentence, as an explication of the philosopher's notion of a statement or proposition.

Semantic ambiguity at the sentence level has its source in the ambiguity of words. A necessary but not sufficient condition for a syntactically unambiguous sentence to be semantically ambiguous is that it contain at least one word having two or more senses. For example, the source of the semantic ambiguity of 'There is no school any more' is the lexical ambiguity of 'school' between the sense in which it means sessions of a teaching institution and the sense in which it means the building in which such sessions are held. But the presence of an ambiguous word is not a sufficient condition for a sentence to be semantically ambiguous. The meaning of other words in the sentence can prevent the ambiguous word(s) from contributing more than one of its (their) senses to the meaning of the whole sentence. Thus, 'The school burned up' is not semantically ambiguous even though it contains an ambiguous word. Here the verb 'burn up' requires its subject

noun to have a sense containing the concept of a physical object. Such selection of senses, and exclusion of others, is reconstructed by the device of including a selection restriction in a reading. This expresses a necessary and sufficient condition for the reading to combine with other readings (by application of projection rules) to form derived readings. A selection restriction is to be interpreted as permitting a combination of readings just in case the reading to which it applies contains the semantic markers to satisfy it. For example, the reading for 'burn up' will have the selection restriction $\langle (\text{Physical Object}) \rangle$, which is satisfied only by a reading for the subject of an occurrence of this verb that contains the semantic marker (Physical Object). This, then, explains why 'The school burned up' is unambiguously interpreted to mean that the building was destroyed by fire.

We may note that semantic anomaly is the limiting case of exclusion by selection restrictions; i.e., it is that case in which every possible reading that might combine with a given reading R is excluded by the selection restriction in R . If R_1, R_2, \dots, R_n are all the readings of an expression E_1 and if the readings for the expression E_2 with which any R_i ($1 \geq i \geq n$) might combine are such that none contains the semantic markers to satisfy the selection restriction in R_i , then there is no derived reading for the compound expression whose parts are E_1 and E_2 . The absence of derived readings is the formal representation of semantic anomaly. Thus, examples such as 'The shadow burned up' or 'Truth burned up' will receive no derived readings, and this will mark them as semantically anomalous sentences.

The dictionary as a whole can be regarded as a component of a rule that assigns readings to the words in a sentence. This rule operates on the labeled bracketing of a sentence that represents its syntactic structure and on the dictionary that contains a set of lexical readings for each word in the sentence. It assigns to each word all and only those lexical readings from its dictionary entry which are compatible with the syntactic categorization the word receives in the labeled bracketing that gives the syntactic description of the sentence. This rule may be formulated as follows:

Let D be the dictionary of the language and LB be a labeled bracketing of the sentence; associate with the word w in LB all and only those readings in the entry for w in D which syntactically categorize w in the same way that w is categorized in LB , i.e., those readings in which the syntactic markers in the initial string are the same as the syntactic markers on the brackets that enclose only w in LB .

By iterated application of this rule each word in a sentence can be associated with a set of readings. This association can be thought of as a pairing of sets of lexical readings with bracketed

words. After this rule has operated in all cases in which it is applicable, every bracketing of a single word is associated with a set of readings and every bracketing of more than one word has, as yet, no set of readings assigned to it. For example, if this rule were to operate on the structure in our first diagram, it would associate a reading that represented the sense 'a confection made with a sweetening agent' with the bracketing '*(candy)_N*', but this bracketing would not receive a reading for the sense of 'candy' in its role of an intransitive verb. If the sentence were instead 'The fruits candy easily', the situation would be the other way round. But notice that no brackets enclosing more than one word, such as '*((hard)_A(candy)_N)_{NP}*', receive readings and that the set of readings assigned to the adjective 'hard' includes not only a reading representing the sense 'not easily penetrated' but also a reading representing the sense 'fit for extreme physical exertion' which has to be weeded out by the projection rule that combines readings of 'hard' with readings of 'candy' to form derived readings for 'hard candy'.

The projection rules operate on the labeled bracketing of a sentence in which some of the bracketed elements do not have sets of readings associated with them. They combine readings already associated with bracketed elements to obtain derived readings for bracketed elements not having readings assigned to them. They proceed from the innermost bracketed elements that do not have readings assigned to them and work their way out to the outermost, combining derived readings which are then combined with other derived readings until a set of derived readings that represents the meaning of the whole sentence is associated with the brackets enclosing the sentence. In this manner, each constituent of a sentence is assigned a set of readings which represents the senses that that constituent has in that sentence.

An example of a projection rule that provides such derived readings is:⁵

(R1) Given two constituents bracketed together by a bracketing labeled **X**, one a head and the other its modifier, such that the former's reading is

R_1 : Syntactic markers of head; $(a_1), (a_2), \dots, (a_n)$; $\langle SR_1 \rangle$

⁵ This projection rule operates on readings assigned to constituents that are related by the modifier-head relation, i.e., cases of adjective-noun modification, adverb-verb modification, adjective-adverb modification, etc. There will be a different projection rule for each different way in which constituents can be grammatically related, for each different grammatical relation specified in the syntax. Thus, there will be another projection rule to combine readings in the case of the grammatical relation between a verb and its subject, another in the case of the grammatical relation between a verb and its object, and so on. The number of projection rules required in a semantic theory is, therefore, dictated by the number of distinct grammatical relations given in the theory of syntactic description.

while the latter's is

R_2 : Syntactic markers of modifier; $(b_1), (b_2), \dots, (b_m)$; $\langle SR_2 \rangle$ and such that $(a_1), (a_2), \dots, (a_n)$ satisfies $\langle SR_2 \rangle$, there is a derived reading assigned to the bracketing labeled X which is of the form

R_3 : X ; $(a_1), (a_2), \dots, (a_n), (b_1), (b_2), \dots, (b_m)$; $\langle SR_1 \rangle$.

This projection rule explicates the process of attribution in language, i.e., the process whereby a new semantically significant entity is created by combining a modifier and its head. As is shown by the way this rule combines a reading of a modifier with a reading of a head, the semantic properties of the new conceptual entity are basically those of the head except that the meaning of the new entity is more determinate than that of the head by virtue of the semantic information contributed by the meaning of the modifier. The rule enforces the selection restriction in the reading of the modifier by allowing the combination just in case the reading of the head has the semantic content required to satisfy it.

We can now introduce the notion of a *semantically interpreted bracketing* of S . We define this as a complete set of pairs, one member of which is a bracketing enclosing a constituent of S and the other member of which is a maximal set of readings for the constituent enclosed. The set of pairs is complete in the sense that every bracketing of a constituent of S is paired with a maximal set of readings, and the sets of readings are maximal in the sense that each set contains every reading that can belong to it on the basis of the dictionary, projection rules, and syntax of S . In terms of this notion, we may define the *semantic interpretation* of S to be (1) the semantically interpreted bracketing of S and (2) the set of statements about S that can be derived from (1) and the following definitions:

Let ' C ' be any constituent of S , any one of its words, phrases, or the whole sentence itself, and let α be the set of readings assigned to C , then

- (D1) C is *semantically anomalous* if, and only if, α contains no members.
- (D2) C is *semantically unambiguous* if, and only if, α contains exactly one member.
- (D3) C is *semantically ambiguous n -ways* if, and only if, α contains n members, $n > 1$.
- (D4) C_1 is *synonymous on a reading* with C_2 , where C_1 and C_2 may be in the same or different sentences and where C_1 may be one sentence and C_2 another (in which case they are called *paraphrases on a reading*), if, and only if, α_1 and α_2 have at least one member in common.
- (D5) C_1 is *fully synonymous* with C_2 if, and only if, α_1 and α_2 are identical.
- (D6) C_1 is *semantically distinct* from C_2 if, and only if, α_1 and α_2 differ by at least one semantic marker.

⁶ This list of definitions contains some of the more important examples of definitions for semantic properties, but it is not intended to be exhaustive. Many of the definitions not included require too much technical discussion. Cf. "Analyticity and Contradiction in Natural Language."

- (D7) S is *analytic on a reading* if, and only if, α contains a reading R such that the reading of the subject of S and the reading for the verb phrase of S that combined to form R, say R_S and R_{VP} , respectively, are such that every semantic marker in R_{VP} is also in R_S .⁶

These definitions predict semantic properties of sentences in terms of formal features of their semantically interpreted bracketing. Since the dictionary and the projection rules are formally specified and only formal features of their output determine what predictions are made about the sentences of a language, there is no possibility of criticizing these definitions of the semantic concepts on grounds of circularity. We do not have to know anything about what speakers would say about a given sentence in order to predict its semantic properties. Rather, the semantic theory enables us to deduce a set of predictions about a sentence which are then compared with what speakers have to say about the sentence in order to test the predictions. Speakers of English will judge that sentences such as 'Truth burned up', 'There is an honest geranium in my garden', and 'Is his insecticide a spinster?' are semantically anomalous, and they will judge that 'The house burned up', 'There is a blue geranium in my garden', and 'Is his insecticide an expensive one?' are not. A semantic theory of English will have to make predictions that coincide with these intuitive judgments. Also, speakers will judge that 'I like civil engineers' is semantically ambiguous, and the theory has to predict the ambiguity of this sentence. Further, the theory will have to predict that 'Eye doctors eye blondes', 'Oculists eye blondes', and 'Blondes are eyed by oculists' are paraphrases of each other, and that 'Eye doctors eye what gentlemen prefer' is not a paraphrase of any of the previous sentences. To take still one further example, a semantic theory will have to distinguish correctly between such analytic sentences as 'Bachelors are unmarried men' and 'Cats are animals', on the one hand, and such nonanalytic sentences as 'Bachelors are unmarred men' and 'Cats are not animals', on the other. The body of semantic interpretations of the sentences of a language, which constitute the semantic theory's description of the semantic structure of that language, are checked in this way against the empirical facts to determine the empirical adequacy of the whole theory. If a semantic theory makes false predictions, the theory has to be revised by making what we think are necessary changes and then checking them out on the basis of further predictions. In this way, we can evaluate the adequacy of dictionary entries and readings for constituents in terms of how well they play their roles within the framework of the over-all semantic theory. Basically, the question of their adequacy is a matter of how well they serve as a basis from which the projection rules can extrapolate readings that correctly repre-

sent the meanings of the sentences of the language. Thus, no dictionary entry or reading can be tested entirely on its own, but, rather, such tests always involve systematic considerations having to do with the adequacy of the syntactic rules, the projection rules, and other dictionary entries and readings.

The Meaning of 'Good'

Within a semantic theory of the kind just described, the task of defining the meaning of the English word 'good' is that of providing an acceptable dictionary entry for 'good' in the sense of the above normal form for dictionary entries. Acceptability is here a matter of how well the entry will serve as a basis from which the meanings of the infinitely many sentences containing 'good' can be projected. Thus, to formulate such an entry, we must ask what semantic information should be included in this entry in order that an otherwise empirically successful semantic theory of English may be able to mark the semantic properties of sentences in which 'good' appears, i.e., their semantic ambiguities, anomalies, paraphrase relations, etc.

We can easily state the syntactic portion of the entry for 'good': 'good' occurs as an adjective, a noun, an interjection, and an adverb. Thus, there will be lexical readings for each of these types of occurrence. However, we will be concerned only with its adjectival and adverbial meanings, for having given readings for them, we will have covered the philosophically interesting cases. We thus ignore occurrences of 'good' as an interjection, e.g., 'Good!', occurrences of it as a noun, e.g., 'The farmer sold his goods at market', and occurrences in idioms, e.g., 'Good Grief!', 'the Good Book', and 'goody-goody'.

Fortunately, there is only one type of sentence that needs to be considered to arrive at a set of lexical readings for the adjective 'good'. These are the simple predicate-adjective sentences, i.e., sentences of the form *Art-N-is-good*. Any syntactically compound sentence containing an occurrence of 'good' as an adjectival modifier of a noun is derived by the syntactic rules from a pair of sentences, one of which is a simple predicate-adjective sentence in which both 'good' and the noun it modifies in the compound sentence appear and the other is the compound sentence minus the occurrence of 'good' modifying this noun. For, in general, compound sentences of the form $X-N-(who, which)-is-A-Y$ or $X-A-N-Y$, where 'X' and 'Y' are variables for strings of words and one may be null, are syntactically constructed out of a pair of sentences of the form $X-N_1-Y$ and $Art-N_2-is-A$ if $N_1 = N_2$.⁷

⁷ Compare C. S. Smith, "A Class of Complex Modifiers in English," *Language*, 37, 3 (Part 1) (July-September, 1961): 342-365, for a detailed treatment of such syntactic constructions and the rules for deriving them.

Because the pattern of such syntactic construction leaves the semantic relations among the words in the two source sentences unchanged,⁸ expressions of the form *N-(who, which)-is-good* and *good-N* have the same semantic content as their corresponding sentences of the form *Art-N-is-good*. This provides us with the motivation we need for confining our attention to occurrences of 'good' in simple predicate-adjective sentences and for regarding the empirical correctness of predictions about the semantic properties of such sentences as evidence for the adequacy of the dictionary entry for the adjectival sense of 'good'.

Such sentences have the labeled bracketing:

$$(((\text{---})_{\text{Art}} (\text{---})_{\text{N}})_{\text{NP}} (((\text{Present})_{\text{Tns}})_{\text{Aux}} (\text{be}) ((\text{good})_{\text{A}})_{\text{Pred}})_{\text{VP}})_{\text{S}}$$

This bracketing provides us with the syntactic information that 'good' is the modifier of the word or sequence of words categorized as a noun.⁹ The projection rule (R1), discussed above, thus embeds a reading for 'good' in a reading for such a word or sequence of words to form a derived reading which combines with readings for the article and the tense constituent to form a reading for the whole sentence. Narrowing our attention now to combinations of readings for 'good' and its head noun, we may start by looking at some of the semantic facts about simple predicate-adjective sentences in which 'good' appears that a semantic theory must predict on the basis of such combinations of readings. Some of the facts against which predictions concerning the semantic anomalousness or nonanomalousness of such sentences must be verified may be stated as follows. Nouns in English divide into two exclusive categories. In one we find 'knife', 'anesthetic', 'money', 'razor blade', 'torture', 'citizen', 'meat', 'poker hand', 'jewelry', 'mother', 'lung', 'watch', 'hammer', etc., and in the other we find 'liquid', 'electricity', 'planet', 'molecule', 'scribble', 'truth', 'speck', 'mote', 'noun', 'amoeba', 'integer', 'grain of sand', etc. If the noun in a sentence of the form *Art-N-is-good* is from the first of these lists, the sentence is not semantically anomalous, whereas, if the noun is from the second, the sentence is semantically anomalous. Compare 'The razor blade is good' with 'The grain of sand is good'. Of course, one could concoct special circumstances in which to attach an interpretation to an utterance of 'The grain of sand is

⁸ This claim follows from the more general principle that syntactic transformations do not affect meaning, which is established in *An Integrated Theory of Linguistic Descriptions*, *op. cit.*

⁹ That is to say, the syntactic theory contains definitions for grammatical relations which allow us to infer the existence of a grammatical relation between constituents of a sentence just in case the labeled bracketing of the sentence satisfies the condition in the appropriate definition. Compare N. Chomsky, "Current Issues in Linguistic Theory" in *The Structure of Language: Readings in the Philosophy of Language*, *op. cit.*

good'—e.g., we are trying to erect a geology exhibit and need a certain kind of grain of sand for a specimen—but, then, the utterance is best regarded as a reduced version of the sentence 'The grain of sand is good for a specimen of the kind we need' rather than as an occurrence of the anomalous sentence. We shall return to this matter at a later point in this section.

A minimum condition for predicting these facts is that the theory contain a generalization expressing the respect in which the members of the first list are semantically similar and in which they are semantically dissimilar to each member of the second list. Such a generalization can be formulated within a semantic theory by introducing a specific semantic marker into every lexical reading for a noun on the first list and excluding this semantic marker from readings for nouns on the second. We shall differentiate the nouns that belong to the first of these two categories from those which belong to the second by introducing what we call an *evaluation semantic marker* into the lexical readings of the former nouns but not the latter's. Roughly, the inclusion or exclusion of this semantic marker indicates whether or not things covered by the meaning of the noun are evaluable in terms of good and bad. In a reading, the evaluation semantic marker functions to represent that component of the meaning of a noun which has to do with the particular respect in which evaluations are made, within the language, of things in the extension of the noun.

Evaluation semantic markers are to be so represented in the notation of a semantic theory that it will be possible to determine from the way in which a semantic marker is written whether it is an evaluation semantic marker. Thus, we write an evaluation semantic marker in the form '(Eval: ())', where the inner parentheses indicate the presence of a semantic marker that specifies the particular aspect of the meaning of the noun which serves as the standard of evaluation. A noun whose meaning is represented by a reading containing an evaluation semantic marker may have other components of its meaning that cannot be represented by such a marker. In this case the reading will contain as well semantic markers that are not evaluation semantic markers. Examples of this case include: 'knife', 'watch', 'lung', 'meat', etc. The lexical reading for 'knife' might be *knife* → Noun, Common Noun, . . . , Count Noun; (Physical Object), (Nonliving), (Blade), (Handle), (Eval: (ease of dividing substances softer than its blade)); < SR >. In the reading for 'knife' the semantic markers that represent the information that a knife has a blade and handle, for example, are not evaluation semantic markers, whereas the semantic marker that represents the information that a knife is used for cutting is. On the other hand, just as there are words whose readings do not contain evaluation semantic

markers, there are words whose readings contain only evaluation semantic markers. For example, the reading for 'anesthetic' contains only the evaluation semantic marker '(Eval: (Effective in producing a temporary loss of feeling in a part of a body))'.¹⁰

The respects in which evaluations of things can be made differ with differences in the other semantic features of the words that refer to those things. Nouns whose readings contain the semantic marker (Artifact), such as 'knife', 'torpedo', 'watch', etc. and nouns whose readings contain the semantic marker (Natural Substance), such as 'coal', 'wood', 'iron', etc. permit evaluation of their referents in terms of the *uses* normally made of them. Alternatively, nouns whose readings contain the semantic marker (Component of a System) or the semantic marker (Member of a Team), such as 'heart', 'camshaft', 'eye', 'quarterback', etc. permit evaluations of their referents in terms of *functions* performed by them in their positions. A noun that has the semantic marker (Role) in its reading, such as 'mother', 'teacher', 'foreman', etc. permits evaluation in terms of the performance of *duties* to which someone occupying such a role is obligated. A noun such as 'jewelry' which has the semantic marker (Ornamentation) in its reading permits evaluation in terms of the *purposes*, decorative and symbolic, that its referents serve. A noun that has the semantic marker (Food) in its reading, such as 'meat', 'apples', 'cheese', etc. permits evaluation in terms of *pleasurability* and perhaps *healthfulness*. There are, of course, many other respects in which things or persons can be evaluated by uttering appropriate sentences, but such further cases must be by-passed as matters of detail.

Such differences in type of evaluation suggest that the evaluation semantic markers in readings be subcategorized in order that nouns may be grouped into subclasses according to the specific different respects in which their referents are evaluated. We may accomplish such subcategorization by subscripting the evaluation semantic markers with symbols representing the concepts of *use*, *function*, *duty*, *purpose*, etc. For example, the evaluation semantic marker in the reading for 'knife' will have a subscript symbol that expresses the fact that a knife is evaluated in terms of its use, whereas the evaluation semantic marker in the reading for 'mother' will have a subscript symbol that expresses the fact that someone who is evaluated as a mother is judged in terms of the performance of duties associated with this role. Employing the abbreviations 'us' for 'use', 'fn' for 'function', 'pu' for 'purpose', 'du' for 'duty', and so on, we can formulate evaluation semantic markers of the types: (Eval_{us}: ()), (Eval_{fn}: ()), (Eval_{pu}: ()), (Eval_{du}: ()), and so on. With these differ-

¹⁰ Among other things, hypnosis is an anesthetic.

entiated evaluation semantic markers we can express generalizations to the effect that artifacts are evaluated on the same basis, that foods are evaluated on the same basis, and so forth.

We can now state the reading for 'good' as an adjective: *good* → Adjective, further syntactic markers; (+); <(Eval_x: ())>, where the semantic marker '(+)' is contextually defined as follows:

Syntactic markers; (M₁), (M₂), . . . , (M_i), . . . , (M_k), (+); <SR>
is by definition equivalent to

Syntactic markers; (M₁), (M₂), . . . , (+ M_i), . . . , (M_k); <SR>

where 'x' is a variable over the subscript symbols 'us', 'fn', 'pu', 'du', etc., and where 'M_i' is an evaluation semantic marker. The left-hand side of this contextual definition is a reading schema that represents a derived reading formed from the combination of the above reading for 'good'—hence the presence of the semantic marker '(+)'—and a reading for a noun. The right-hand side is a reading schema that represents the reading into which such a derived reading is converted by the operation of '(+)', i.e., by the application of this contextual definition. The selection restriction in the reading for 'good', viz. <(Eval_x: ())>, imposes the requirement that a derived reading formed from the reading for 'good' and a reading for a noun can result only if the reading for this noun contains an occurrence of an evaluation semantic marker.

We can now show how a semantic theory of English can predict the aforementioned facts about the semantic anomaly of sentences such as 'The grain of sand is good', 'The liquid is good', 'The scribble is good', 'The planet is good', etc. and the nonanomalousness of sentences such as 'The razor blade is good', 'The watch is good', 'The meat is good', 'The poker hand is good', etc. Sentences of the former type have subject nouns whose readings contain no occurrence of an evaluation semantic marker and thus, in their semantic interpretation, these sentences receive no readings because their subjects' readings do not satisfy the selection restriction in the reading for 'good'. Therefore, by (D1), these sentences are marked as semantically anomalous. On the other hand, sentences of the latter type, because their subject nouns have readings containing an evaluation semantic marker and so satisfy the selection restriction in the reading for 'good', receive a set of readings and are marked as nonanomalous.

'(+ Eval_{us}: ())' is to be construed as specifying that the object concerned has the ability to perform the task indicated in '()', '(+ Eval_{fn}: ())' as specifying that the object concerned has the ability to perform the function indicated in '()', '(+ Eval_{pu}: ())' that the object concerned has the ability to serve the purpose indicated in '()', '(+ Eval_{du}: ())' that

the person concerned has successfully carried out the duties indicated in '()', and so forth. '(+ Eval_{us}: (Reliability in keeping accurate time under normal conditions))', the evaluation semantic marker in the reading for the sentence 'The watch is good', specifies that the timepiece concerned has the ability to keep accurate time reliably under normal conditions. Alternatively, an unplused occurrence of an evaluation semantic marker specifies only the relevant standard of evaluation; it does not specify any specific evaluation that can be made on the basis of the standard. Thus, the evaluation semantic marker in the reading for the sentence 'The watch was found in his pocket', implies no actual evaluation of the watch.

This mode of construing the plus immediately suggests a lexical reading for 'bad'. The reading for adjectival occurrences of 'bad' should be identical with the reading for 'good' except that, where '(+)' appears in the reading for 'good', '(-)' appears in the reading for 'bad'. The contextual definition for '(-)', which specifies the operation of this semantic marker, is, then, to be the same as that for '(+)' except that wherever '+' appears in the above contextual definition '-' appears in the equivalence defining '(-)'. '(-)' is thus the opposite of '(+)' in the sense that '(- Eval_x: ())' is to be construed as specifying the inability of the object concerned to perform the task indicated in '()' in case 'x' has the value 'us', and similarly for other kinds of evaluation semantic markers.¹¹ With this lexical reading for 'bad', we can account for the further facts that 'The grain of sand is bad' and so forth are also semantically anomalous. The reading for 'bad' has the same selection restriction as the reading for 'good', and so such sentences receive no readings and are consequently marked as semantically anomalous.

Besides enabling us to predict the semantically anomalous and nonanomalous sentences containing an adjectival occurrence of 'good', these dictionary entries for 'good' and 'bad' in conjunction with suitably formulated entries for the nouns of the language

¹¹ Note that the actual features a thing must have to enable a certain use to be made of it, to enable it to perform a certain function, to permit it to serve a certain purpose, etc. are not, and should not be, determined by the dictionary entry for the word that refers to such things. Thus, what actual features watches, hearts, quarterbacks, stockmarket consultants, etc. must possess in order to be good watches, hearts, quarterbacks, stockmarket consultants, etc. is not something a person knows qua speaker of the language, but, rather, is something he knows qua specialist or expert of some sort, i.e., qua watchmaker, physiologist, football coach, stockmarket expert, etc. One who knows English knows that a good watch is reliable in keeping accurate time under normal conditions, but, unless he is also a watchmaker, he need not know anything at all about the physical properties of watch mechanisms—about mainsprings, jewels, etc.—that enable watches to perform properly.

enable us to represent the intuitively acceptable senses of the nonanomalous cases. Roughly, the derived reading for the sentence 'The knife is good' will be: Sentence; (Some contextually definite), (Physical Object), (Nonliving), (Blade), (Handle), (+ Eval_{us}: (ease of dividing substances softer than its blade)); < SR >. The derived reading for 'The knife is bad' will be the same except for the appropriate change of sign. The former reading represents the fact that 'The knife is good' means that the knife cuts easily what it is supposed to cut; the latter, the fact that 'The knife is bad' means that the knife is not a satisfactory tool to use in cutting. In addition, the theoretical machinery introduced to enable us to represent the meaning of 'good' or 'bad' also enables us to represent the meanings of certain nouns whose meaning has a certain form of goodness, or badness, built into it. Thus, we can propose the following lexical reading for 'bonanza': noun; (Ore Deposit), (Excavated), (+ Eval_{cd}: (Abundant in valuable ore)), where 'cd' indicates a subclass of standards having to do with evaluation in terms of condition. If we define the word 'mine' with the lexical reading: noun; (Ore Deposit), (Excavated), (Eval_{cd}: (Abundant in valuable ore)), we will have successfully distinguished between the meanings of these two nouns (whose meanings are so close) in terms of the presence or absence of a plus on the evaluation semantic marker. Given the interpretation of the presence or absence of a plus, this appears to be just the right semantic difference between them.¹² Moreover, there are cases of triplets of nouns whose meanings are the same except for plused, nonsigned, and minused evaluation semantic markers, e.g., respectively 'gusher', 'oil well', and 'dry hole'. Now, important predictions about the semantic properties of sentences can be obtained from such lexical readings. The sentence 'The bonanza is good' will be marked as analytic by (D7) because the reading for its subject noun 'bonanza' already contains the semantic marker '(+)' which is to be added when the reading for the verb phrase, which contains the reading for 'good', is combined with it to form a derived reading for the whole sentence. 'The mine is good' will, correspondingly, be marked as nonanalytic because the combination of the reading for 'mine' and the reading for 'good' involves a nonredundant addition of the semantic marker '(+)'. Also, since the noun 'mine' has at least the additional lexical reading: Noun; (Physical Object), (Explosive Charge), (Eval_{pu}: destruction of enemy personnel, vehicles, or vessels)), the sentence 'The mine is good' is, on the basis of (D3),

¹² I am aware that this treatment of 'bonanza' is somewhat of an understatement, that a bonanza is more than a good mine. But this point, though it involves only minor adjustments in the treatment of these words, leads to complications that are better left out of a paper of this nature.

marked as at least 2-ways semantically ambiguous. Furthermore, just as 'The bonanza is good' and 'The gusher is good' are both marked as analytic sentences, the sentence 'The dry hole is bad' will be marked as analytic. Finally, for those readers who are familiar with "Analyticity and Contradiction in Natural Language," we note that 'The mine is good', 'The oil well is good', and similar cases are marked as synthetic and that, because the semantic markers '(+)' and '(-)' are antonymous semantic markers, the sentences 'The bonanza is bad', 'The gusher is bad', and 'The dry hole is good' are each marked as contradictory and a sentence that results from just the replacement of 'good' for 'bad' or 'bad' for 'good' in any sentence of the kind we are considering is inconsistent with the original sentence.

We now return to a previous point. Even though 'The scribble is good', 'The liquid is good', and 'The planet is good' are semantically anomalous, sentences such as 'The scribble is good for diagnosing the patient's neurosis', 'The liquid is good to drink', and 'The planet is good as a subject for class discussion' are not. Moreover, sentences such as 'The knife is good to pry open jars with', 'The knife is good for picking teeth', 'The knife is good because it has a grip handle', etc. express evaluations different from that expressed by 'The knife is good', and these evaluations are not predictable from the dictionary entries for 'good' and 'knife' alone. However, none of these facts, including, in particular, the fact that the meaning of the last triplet of sentences is not predictable from the dictionary entries of 'good' and 'knife' as presented above, is a basis for criticizing our account so far. A construction such as 'X is good for Y-ing', 'X is good to Y', 'X is good as a Y', 'X is good because it is a Y', etc. can easily have its meaning described as a compositional function of the meanings of its parts, so long as the meanings of *all* its parts are taken into account. Such constructions play a very special role in language: they permit speakers to depart from standard forms of evaluation and to make evaluations suitable to special occasions, to specific needs and motives, to idiosyncratic jobs, etc. In such constructions, we can variably supply the semantic information that functions as the standard of evaluation by filling in 'Y' with an appropriate expression of the language, as, in the above cases, 'diagnosing the patient's neurosis', 'prying open jars', 'picking teeth', etc. A semantic theory of the kind we have been describing can correctly interpret sentences based on such constructions by including in the dictionary entries for the words 'for', 'to', 'as', 'because', etc. semantic markers which formalize an instruction to the effect that, when one of these words appears in such a construction, the reading of the expression that it introduces either institutes an evaluation semantic marker where there was none before

or replaces the semantic-marker content of the evaluation semantic marker of the sentence's subject noun. In the case of 'The knife is good for picking teeth', the reading for 'picking teeth' replaces '(ease of dividing substances softer than its blade)' in '(Eval_{us}: (ease of dividing substances softer than its blade))'. Thus cases of the kind treated in this paragraph are not exceptions to our account but, rather, provide further confirmation for it.

Notice that, in the case of *Art-N-is-good* sentences in which N has a reading that contains, beside an evaluation semantic marker, semantic markers that are not evaluation semantic markers, the semantic markers '(+)' and '(-)' do not operate on any of them. This is the formal explication of the English speaker's intuition that an evaluation of the goodness or badness of a thing has nothing *per se* to do with its having any one or another of the properties whose presence is, as it were, guaranteed definitionally. This explains why, for example, a knife is not evaluated as good by virtue of its being a physical object, having a handle, or having a blade.

Next, we turn to the prediction of paraphrase relations (or synonymy relations) between sentences containing 'good'. To provide an exhaustive treatment both of these relations and of the dictionary entry for 'good', we must consider the lexical reading for adverbial occurrences of 'good'. As an adverb, 'good' occurs in sentences of two types: those of the form *NP-Aux-V_{tr}-NP-Adv* and those of the form *NP-Aux-V_{intr}-Adv*. In both, 'good' occurs phonologically or orthographically as 'well'. Since in both types 'good' is a modifier of the verb, the grammatical relation here is the same as in the case where 'good' is an adjectival modifier, and so (R1) is the projection rule that provides derived readings for verb phrases in which 'good' occurs adverbially. The same is, of course, true for 'bad' as an adverb, which appears as 'badly'. Thus, the simplest and most uniform treatment of the meaning of 'good' and 'bad' is one in which their adverbial occurrences are interpreted on the basis of the same lexical readings as their adjectival occurrences. We may carry over the semantic constructions we found successful in the case of their adjectival forms by including alternate adverbial markers with the adjective markers in the syntactic portion of their lexical readings. These lexical readings are thus: *good* → A, A₁, A₂, . . . , A_n or Adv, Adv₁, Adv₂, . . . , Adv_m; (+); <(Eval_x: ())>, and *bad* → A, A₁, A₂, . . . , A_n or Adv, Adv₁, Adv₂, . . . , Adv_m; (-); <(Eval_x: ())>.¹³ This treatment is possible because the syntactic structure of 'well' and 'badly' are, respectively, 'good + ly'

¹³ There seems to be some prospect of deriving adverbial occurrences of 'good' and 'bad' from adjectival occurrences. If this is so, these new readings will be unnecessary.

and 'bad + ly'. 'Well' and 'badly' are simply the pronunciations or orthographic realizations of these underlying syntactic forms.

Now, consider the fact that the sentences 'The knife is good' and 'The knife is bad' are paraphrases of 'The knife cuts well' and 'The knife cuts badly'.¹⁴ In order to be able to predict this fact on the basis of (D4), we must construct a lexical reading for the intransitive verb 'cuts' so that those sentences in which it occurs have the same reading as their copula-sentence paraphrases. Thus, we give: *cuts* \rightarrow V, V_{intr}, further syntactic markers; (Process), . . . , (Eval_{us}: (Ease of dividing substances softer than blade of X)); < Subject/(Physical Object)>, where 'X' is the reading of the subject of 'cuts'. By the application of (R1), this evaluation semantic marker will be appropriately plused or minused to yield derived readings that are the same as those for the corresponding copula-sentence paraphrases. In this way, these paraphrase relations, and others like them, can be predicted on the basis of the semantic interpretations of the sentences between which they hold.

The treatment of paraphrase relations between copula sentences and sentences with transitive main verbs, though essentially the same, is slightly more complicated because account must be taken of the fact that in the latter type of sentence the goodness or badness of the process, action, etc. expressed by the verb is restricted by the meaning of the verb's nominal object. Thus, the sentences 'The knife cuts meat well' and 'The knife cuts meat badly', which are paraphrases, respectively, of 'The knife is good for cutting meat' and 'The knife is bad for cutting meat', make far less comprehensive evaluations concerning the knife. The first of these two sentences says that the knife is suitably adapted to cutting meat, but it does not imply that it is also suitable for cutting wood, metal, cloth, or other substances. Likewise, the second does not imply that the knife is not suitably adapted to cutting wood, metal, cloth, or other substances. In order to take account of this semantic relation to the reading of the nominal object, it is necessary only to capitalize on a general feature of the readings of transitive verbs. Just as the reading for an intransitive verb contains a slot that takes the reading of its subject, so the readings for transitive verbs contain slots that fix the places at which the readings of their subjects and objects are embedded by the projection rule that combines a reading of a transitive verb with a reading of its subject and the projection rule that combines a reading of a transitive verb with a reading of its object. For example, the reading for 'eats' might be:

¹⁴ More precisely, they are paraphrases on a reading. 'The knife cuts badly' is, of course, semantically ambiguous, having both the sense that it cuts poorly and the sense that it inflicts severe wounds.

eats \rightarrow V, V_{tr}; (Process), (Physiological), . . . , (X takes in through mouth and swallows Y); < Subject/(Physical Object) and Object/(Physical Object) >, where the 'X' is the slot for the reading of the subject of 'eats' in a particular sentence and the 'Y' is the slot for the reading of its object. Accordingly, the reading for a transitive occurrence of 'cuts' might be: *cuts* \rightarrow V, V_{tr}; (Process), . . . , (Eval_{us}: (Ease of X dividing Y)); < Subject/(Physical Object) and Object/(Physical Object) >. In both of our examples, the slot 'X' is filled by the reading for 'knife' and the slot 'Y' is filled by the reading for 'meat'. Given this reading for 'cuts' as a transitive verb, not only can a semantic theory reveal how the evaluation of the thing to which the subject in a sentence of the form *NP-Aux-cuts-NP-Adv* (Adv = 'well' or Adv = 'badly') refers is appropriately restricted by the meaning of the object, but it can also correctly mark the paraphrase relations between such sentences and others of different syntactic form. A similar treatment of the lexical readings of other transitive and intransitive verbs will enable us to obtain correct predictions about the paraphrase relations in different sentences of the types we have been considering.¹⁵

Adverbial occurrences of 'good' and 'bad' can also modify adjectives, as in 'She likes a good green hat', where this means 'a hat colored a good green'. But these cases deserve no special comment. An adjective that can be modified by 'good' or 'bad' will receive a lexical reading containing an evaluation semantic marker that expresses the respect in which the attribute concerned is evaluated within the language.

We should briefly comment on the further problem of providing semantic interpretations for comparative and superlative sentences with 'good' and 'bad'. In order to interpret such sentences semantically, we need dictionary entries for the forms *as A as*, *A'er than*, and *A'est*. On the basis of the previous discussion, the general line along which such entries are to be constructed is clear, even if the specific details are not. We require a semantic marker that functions as an operator on the plus or minus attached to an evaluation semantic marker. This operator ex-

¹⁵ The selection restriction in the readings for both intransitive and transitive occurrences of 'cuts' requires that the readings with which the verb phrase that contains 'cuts' can combine, viz., those for its subject, include the semantic marker (Physical Object). This enables a semantic theory to predict the semantic anomaly of a sentence such as 'The belief cut the meat'. Likewise, the selection restriction in the readings for 'well' and 'badly' requires that the readings for verbs must include an evaluation semantic marker. Thus, the sentences 'The man knows well' and 'The man believes John well' are both marked as semantically anomalous because 'knows' and 'believes', in the appropriate senses, do not have an evaluation semantic marker in their readings. Sentences such as 'The man knows John well' involve both a different sense of 'knows' and a different sense of 'well'.

presses the relation between the degrees of different signs. *as A as*, where *A* = 'good' or 'bad', specifies that the degree of the signs in the readings for the two nouns compared is equal; e.g., that the degree of the plus in the reading for 'knife' is equal to the degree of the plus in the reading for 'shovel' in the sentence 'The knife is as good as the shovel'. *N₁ is better (worse) than N₂* specifies that the degree of the sign in the reading for *N₁* is higher than the degree of the sign in the reading for *N₂*; e.g., that the degree of the plus in the reading for 'knife' is higher than the degree of the plus in the reading for 'razor' in the sentence 'The knife is better than the razor'. *N₁ is the best (worst) of the N₂s* specifies that the degree of the sign in the reading for *N₁* is higher than that in the reading for any *N* that is one of the *N₂s*; e.g., that the plus in the reading for 'knife' in 'The knife is the best of the tools' is higher than the plus in the reading for 'the saw I bought yesterday', 'the screwdriver', 'the solid steel hammer', 'my rusty chisel', etc., where these *N*'s refer to things belonging to the collection referred to previously by 'the tools'. A full analysis of these forms is beyond our scope here.

Earlier we introduced a subcategorization of the evaluation semantic marker. We can now further justify the subcategories of *use, function, purpose, duty*, etc. on the grounds that they are necessary in order for a semantic theory to mark the semantic anomalousness of certain comparative constructions. Consider the semantically anomalous sentences 'The knife is as good as my mother' and 'The teacher is better than the jewelry', and compare them, respectively, with the nonanomalous sentences 'The knife is as good as the screwdriver' and 'The teacher is better than the lawyer'. Roughly speaking, the former cases are semantically anomalous because they involve a comparison of things that are not capable of being evaluated by the same particular standard of goodness and badness, whereas the latter cases are nonanomalous because they compare things on the basis of a common standard of evaluation. Thus, in 'The knife is as good as the screwdriver' we have an evaluation to the effect that the knife performs the use normally made of knives as efficiently as the screwdriver does the use normally made of screwdrivers, and in 'The teacher is better than the lawyer' we have an evaluation to the effect that the teacher performs his duties as a teacher better than the lawyer does his as a lawyer. These anomalous and nonanomalous cases can be predicted if we introduce in the lexical readings for the forms *as A as*, *A'er than*, and *A'est a* a selection restriction that requires the readings of the nouns compared to have the same subcategory of evaluation semantic marker. Suitable formulations of the lexical readings of these comparative and superlative forms will also enable us to represent the meanings of nonanomalous

sentences of the type under consideration. The need to have such subcategorization for these purposes is, then, further justification for it.

Semantic Theories

Traditionally, the critical test of a theory of meaning is its ability to represent adequately the meaning of any word or expression in the language. Philosophers have thus rightly rejected theories that identify the meanings of words and expressions with their referents, on the grounds that such theories cannot represent the meanings of such pairs of expressions as 'the morning star' and 'the evening star' in a way that exhibits the difference in meaning between them. We shall employ this form of argument to show that special features of the meaning of 'good' provide us with grounds for rejecting some currently popular theories of meaning and with additional grounds for accepting the sort of semantic theory we have been describing.

The meaning of 'good', as we have seen in the previous section, does not have the kind of structure that the meanings of most other English words have. Whereas the meaning of a word such as 'bachelor', 'honest', 'hard', 'cuts', 'liquid', etc. is made up of component elements that are attributes in their own right, the meaning of 'good' is a function that operates on other meanings, not an independent attribute. Apart from combination with the conceptual content of other words and expressions, the meaning of 'good' does not make sense. Since the meaning of 'good' cannot stand alone as a complete concept, we shall say that the meaning of 'good' is *syncategorematic*.

The semantic marker '(+)' provides the theoretical machinery required to handle this syncategorematicity. In conjunction with the system of evaluation semantic markers and the selection restriction in the lexical readings for 'good', '(+)' enables a semantic theory to reconstruct formally the dependency of the meaning of 'good' on certain semantic properties of the words and expressions that 'good' can modify. Thus, this semantic marker has significance only within a reading that contains an evaluation semantic marker, and its significance lies in the way in which it operates on that evaluation semantic marker to produce a correct representation of the meaning of the constituent to which the reading is assigned.

Therefore, for a semantic theory to be able to represent the meaning of 'good', it must be designed to do more than simply characterize the meanings of words and expressions individually. No theory of meaning can give the meaning of 'good' in the form of some individual specification for this word, because, since the meaning of 'good' is syncategorematic, it cannot be given in such

terms. This observation suffices to show that a number of different types of semantic theories are empirically inadequate. Included in this category are Platonic theories of meaning, Osgood's theory based on his Semantic Differential,¹⁶ reference or designation theories of meaning,¹⁷ stimulus-response theories of meaning such as Skinner's and Quine's,¹⁸ and theories that identify meaning with information content (in the communication engineer's sense).¹⁹ The basic idea underlying each of these conceptions of meaning would limit a semantic theory to stating the meanings of words individually.

Another serious defect of such theories is that the meanings of expressions and sentences in which 'good' appears cannot be given by listing them and pairing each one with some sort of semantic characterization. In principle, such a procedure, which is the only one ever offered by the proponents of these theories, would leave infinitely many expressions and sentences containing 'good' uncharacterized, since any finite list would necessarily leave out infinitely many cases. 'Good' occurs in noun phrases and also in verb phrases that have noun-phrase objects. Because of the recursive nature of the syntactic mechanism for forming noun phrases, there is no longest noun phrase, and hence no longest expression or sentence that contains 'good'. The length of a noun phrase can always be increased by adding another modifier such as a relative clause or another modifier within a relative clause,²⁰ and such additions can always affect the contribution that the meaning of an occurrence of 'good' makes to the whole. To appreciate this, it is necessary only to recall that in sentences of the form $NP_1-V_{tr}-NP_2$ -well the evaluation expressed is limited in scope by the meaning of NP_2 . For example, if the sentence 'The knife cuts meat well' is expanded by adding a relative clause to the noun 'meat', thus forming the sentence 'The knife cuts meat that is tenderized well', then the evaluation, the claim about the knife's performance, made by this newly formed sentence is restricted as compared with that made by the original sentence. Such an evaluation can be further and further restricted by adding other components to the relative clause, e.g., 'by a new

¹⁶ C. E. Osgood, G. J. Suci, and P. H. Tannenbaum, *The Measurement of Meaning* (Urbana: Univ. of Illinois Press, 1957).

¹⁷ An example of such a theory is one of Carnap's early conceptions of meaning, in which the semantic interpretation for the descriptive symbols of a system was given solely in terms of rules of designation.

¹⁸ B. F. Skinner, *Verbal Behavior* (New York: Appleton-Century-Crofts, 1957), and W. V. Quine, *Word and Object* (Cambridge, Mass.: MIT Press, 1960), particularly Chapter 2.

¹⁹ Compare any of the wide variety of approaches to meaning based on C. E. Shannon and W. Weaver, *The Mathematical Theory of Communication* (Urbana: Univ. of Illinois Press, 1949).

²⁰ Compare "A Class of Complex Modifiers in English."

process', or other relative clauses, e.g., 'and which is boiled for six days'.

Thus, besides its syncategorematic feature, the meaning of 'good' has other features that make it an adequate basis from which to project the meaning of infinitely many syntactically compound expressions and sentences containing 'good', as a compositional function of the meanings of their components. This *compositional potentiality* makes the dependency resulting from the syncategorematic feature a part of the system of interrelations whereby the meaning of 'good' contributes to the meaning of expressions and sentences. In terms of this concept of compositional potentiality, we may criticize certain theories of meaning whose conception of the meaning of a word is too loosely formulated to be criticized on the grounds that it cannot account for syncategorematicity. These theories characterize meaning in such a manner that there is no way for them to relate the meaning of a word to the meaning of other words in an infinite variety of syntactic construction. An example of one such theory is the conception of meaning according to which the meaning of a word is construed as its distribution in a set of linguistic frames, where occurrence in the same set of frames, holding constant some such parameter as truth or oddity, is the test of synonymy. Another example is the pure version of the emotive theory of meaning proposed by certain positivists.²¹ Still other examples can be found in the various "use" theories of meaning propounded by ordinary-language philosophers.²² None of these theories has the conceptual machinery for relating meanings to one another that is necessary to reconstruct the way that the compositional potentiality of word meanings is realized at the expression and sentence levels.

Among the theories of meaning that do provide some conceptual machinery for interrelating meanings, only the theory described above provides the kind of machinery needed to handle the syncategorematic and compositional potentiality aspects of the meaning of 'good'. The other theories, two examples of which are Wittgenstein's picture theory of meaning²³ and Carnap's intentionalist account in *Meaning and Necessity* ("Meaning Postulates," etc.),²⁴ fail to extend their compositional analysis of meaning down to the level of the minimally syntactically functioning elements of the language, i.e., down to the semantic structure of the meaning of words, or whatever unit is syntactically minimal. Because these theories do not decompose the meanings of words

²¹ For example, in Carnap's earliest writings, or in C. L. Stevenson, *Ethics and Language* (New Haven: Yale Univ. Press, 1945).

²² For example, L. Wittgenstein, *Philosophical Investigations* (Oxford: Basil Blackwell, 1953); other examples are too numerous to mention.

²³ *Tractatus Logico-Philosophicus* (London: Kegan Paul, 1922).

²⁴ Chicago: Univ. of Chicago Press, 1947.

into their component semantic elements, they provide no basis for dividing such elements into those which are and those which are not affected by the meaning of 'good'. For example, the meaning of 'good' in constructions such as 'good knife', 'good lung', 'good citizen', etc. affects only the evaluational component in the meaning of 'knife', 'lung', 'citizen', etc. It does not affect those components, such as the concept of having a handle, being a physical object, or being human, etc. which have to do with the physical characteristics that are part of the meaning of 'knife', 'lung', 'citizen', etc. Thus, on these theories there is no possibility of working out a contextual definition of the meaning of 'good' that is selective in the appropriate sense. As we have seen, for such a contextual definition, it is necessary to break down the meanings of words that 'good' can modify into at least two kinds of semantic elements, those which are related to the meaning of 'good' and those which are not, since such a definition connects the meaning of 'good' with the meanings of nouns, verbs, and adjectives only in terms of such a division into semantic elements. Furthermore, such theories will be unable to formulate selection restrictions on semantically acceptable combinations without such a division. This means that they will be unable to predict the semantically anomalous sentences whose anomaly has to do with the meaning of 'good', predict the semantic ambiguities in sentences where the meaning of 'good' influences the degree of semantic ambiguity, and so forth.

Implications

One can naturally expect that an account of the meaning of 'good' will have something to say about the controversy in moral philosophy between naturalists and nonnaturalists. We might put the implications of our account for this controversy as follows: It has been a mistake, on the part of both groups, to argue the issue between them solely in terms of the common conception of definition. If the issue of the definability of 'good' is framed in terms of this sort of definition, then the nonnaturalist is right: 'good' cannot be so defined in naturalistic terms. But this is a pyrrhic victory, for this failure results from a too limited conception of definition. A possible implication of our treatment of the meaning of 'good' is that its meaning can be given in naturalistic terms, if its meaning is given by a recursive definition of the appropriate sort, i.e., one that consists of an empirically adequate dictionary and a formally adequate set of projection rules. A definition of 'good' in these terms has been given above. But this, too, may be only a pyrrhic victory. For the issue between the naturalist and nonnaturalist can immediately be rephrased in

terms of such a recursive definition. The nonnaturalist may admit that the dictionary entry for 'good' is a definition of 'good', but he may argue that this construction depends on the entries in the dictionary for the nouns, verbs, and other adjectives of the language, since their adequacy is presupposed for the semantic interpretation of sentences. Thus, he may raise the question of whether any of these entries must be formulated using semantic markers that represent strictly moral concepts. To this the naturalist may reply that a very great many of the words that 'good' can modify can be given entries, say in the manner suggested above, in the section on the Meaning of 'Good', which are naturalistically acceptable. At this point, the nonnaturalist may counter by pointing out that it is still a moot question what semantic information has to be included in the dictionary entry for 'man' in order to obtain correct readings for 'good man.' Thus, the direct implications of this study of the meaning of 'good' do not settle the matter one way or the other. The only claim that can be made for their philosophical significance is that they provide a new, promising framework for carrying on the controversy.

One further philosophical implication may be considered here. Recently, Zeno Vendler claimed that what underlies Moore's intuition about the nonnaturalness of good is the fact that 'good' is more remote from the syntactic subject of a sentence than are adjectives that represent natural properties.²⁵ This proposed explanation of Moore's intuition was welcomed because, as even naturalists themselves will admit, Moore seems to have put his finger on something quite important, and, until it is known exactly what his intuition is an intuition of, its philosophical relevance remains obscure. But Vendler's explanation breaks down, and so the question of what Moore had his finger on still requires an answer.

We first observe that, although 'good' may be more remote from the noun it modifies than any of the other adjectives modifying this noun in a syntactically compound sentence *S*, 'good' is just as close as any of these adjectives with respect to the *n* source sentences out of which *S* is syntactically constructed. That is to say, *S*, which has the form *X-good-A_{n-1}-A_{n-2}-...-A₁-N-Y*, is syntactically derived from the source sentences *Art-N-Aux-is-A₁*, *Art-N-Aux-is-A₂*, . . . , *Art-N-Aux-is-A_{n-1}*, *Art-N-Aux-is-good* by successively embedding them in the matrix sentence *X-N-Y*; and, with respect to these source sentences, which are logically antecedent to the compound sentence, 'good' is as close to *N* as is any other *A_i* ($1 \leq i \leq n-1$). This observation raises the

²⁵ "The Grammar of Goodness," *The Philosophical Review*, 72, 4 (October, 1963): 446-465.

question of why special significance should be attached to remoteness from a noun head in a compound sentence when this difference in ordering disappears with respect to the sentences that underlie the compound sentence. Moreover, in the form intermediate between the source sentences and the compound with prenominal positioned adjectives, $X-N-(\textit{which, who}) \textit{ is good},-(\textit{which, who}) \textit{ is } A_{n-1}-(\textit{which, who}) \textit{ is } A_{n-2},- \dots -\textit{and}-(\textit{which, who}) \textit{ is } A_1-Y$, 'good' may be closest to the noun. Furthermore, it is clear on other grounds that the ordering of adjectives is a semantically irrelevant syntactic feature, on a par with the semantically irrelevant difference in ordering between the object and particle in such a pair of sentences as 'He looked up the fact' and 'He looked the fact up'. The evidence that has been accumulated shows that the only syntactic properties that are semantically relevant are those which determine the grammatical relations within a sentence, i.e., subject of sentence, object of sentence, modification, etc.²⁶ The ordering of adjectives in prenominal position is thus semantically irrelevant, because all the syntactic properties necessary to determine cases of adjective-noun modification are found in the source and matrix sentences where no ordering exists. These formal points show what can be expressed informally by saying that Vendler's explanation is unconvincing because, as is amply clear from the passage of Moore's that Vendler quotes,²⁷ Moore had in mind a *difference in kind* (between the meaning of 'good' and the meaning of words like, say, 'horse'), not a *difference in degree*, and this difference had to do with something conceptual, not something merely syntactic.

By drawing on our treatment of the meaning of 'good', we may now try to explain what Moore had his finger on, what his intuition concerning the nonnaturalness of good was about. We propose that Moore's intuition was an intuition of the syncategorematicity of the meaning of 'good'. This explanation provides just the right difference in kind between 'good' and the cases Moore wished to distinguish from it. However, on this explanation, nothing of conclusive philosophical import follows from accepting Moore's claim about the nonnaturalness of 'good', since a naturalist could use this explanation to account for his feeling that Moore had a genuine insight without thereby committing himself to anything that would undermine his ethical naturalism.

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²⁶ *An Integrated Theory of Linguistic Descriptions*.

²⁷ Vendler, *op. cit.*, p. 446.