

A DEVELOPMENT OF SEMANTIC THEORIES IN THE TWENTIETH CENTURY

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I. Introduction

The theme of this paper is "some development of semantic theories in the twentieth century." The focus of discussion will be on the relationship of individual words and combinations of words which will be exemplified by the 'semantic field' concept proposed by Trier and Porzig, and the 'componential analysis' by many American linguists and anthropologists. In the later part of this paper, "Explorations in semantic Theory"¹⁾ by Weinreich will be introduced.

The ancient philosophers such as Thucydides, Proclus, Democritus, and Aristotle made many penetrating observations on the sense and use of words and noticed several fundamental aspects of semantic change.

In the first half of the nineteenth century, because of the rise of comparative philology, or scientific linguistics in the modern sense, it became necessary to explore the semantic side of language. Since about 1825, the classical scholar Reisig had begun to evolve a new conception of grammar. In his uni-

versity lectures on Latin philology, he set up 'semasiology,' the study of meaning, as one of the three main divisions of grammar. He regarded 'semasiology' as historical discipline which would seek to establish 'the principles governing the development of meaning.' But he had as yet no very clear ideas about the subject-matter of 'semasiology.'

The second phase in the history of semantics began in the early 1880's and lasted almost exactly half a century. It was ushered in by an article published by Bréal in 1883 in a classical journal, in which he outlined the programme of the 'new science' and gave the name 'semantics' *i.e.* the science of meaning. Bréal also regarded semantics as a purely historical study.

In the first three decades of the twentieth century, considerable progress was made in the study of changes of meaning. The crowning achievement of this period was the book published in 1931 by Gustaf Stern under the title *Meaning and Change of Meaning with Special Reference to the English Language*, where a new, purely empirical classification of semantic changes was made.

In the same year, another work which opened a new phase in the history of semantics was published. It was Jost Trier's

1)

Uriel Weinreich, "Explorations in Semantic Theory" *Current Trends in Linguistics* Vol. III: (ed.) Thomas A. Sebeok, 1966 Mouton & Co., The Hague pp. 395-477

monograph on terms of knowledge and intelligence in German. In general linguistics, Saussure's idea of synchronic and diachronic was very influential around the time when Trier published his book in 1931, and Trier's monograph on terms of knowledge and intelligence in German was the first serious attempt to introduce Saussure's principles into semantics. From a structural standpoint, Trier elaborated a theory concerning semantic field as it will be discussed later.

After Saussure, there has been the shift of emphasis toward descriptive semantics. Ullmann says, "Synchronistic semantics is the science of meaning, diachronistic semantics the science of change of meaning. The former revolves round the semantic relationship, simple or multiple; the latter is concerned with semantic change."²⁾

Except for Edward Sapir there was a tendency before World War II for American linguists to shy away from semantic studies, since a concern for structural analysis dominated the scene. Moreover, following the lead of Leonard Bloomfield, they saw little merit in trying to define the content of meaning, since presumably such a definition could be produced only by all the descriptive science working together to describe man's total environment and behavior. However, Bloomfield did not repudiate meaning as irrelevant to language or linguistic study, but his seemingly negative approach to meaning was in a sense a definition by restriction. He says, "In language, form

cannot be separated from their meanings. It would be uninteresting and perhaps not very profitable to study the mere sound of a language without any consideration of meaning (but) ... we must start from forms and not from meanings."³⁾

In this period, in the study of meaning, attention has shifted from concern with the referents to the distribution of the form within the total behavior, so that, as Bloomfield (1943) states, "The features of situation and action which are common to all utterances of a speech form are the meaning of that speech form." Harris defines the meaning in the same way.

A somewhat different approach to language and meaning is the work of the symbolic logician. Charles Pierce (1934: *Collected Papers*), and Charles Morris (1946: *Signs, Language and Behavior*) have divided their study of meaning into three main parts, usually called semantics, syntactics and pragmatics. For symbolic logicians, semantics deals with the relationship of signs (or symbols) to referents, corresponding roughly to what people usually think of as the meaning of words.

Although there are various scientific approaches to meaning, the principal diffe-

2)

Stephen Ullmann, *The Principles of Semantics*, 1957, Barnes and Noble, Inc., New York p. 171

3)

Leonard Bloomfield, *Meaning. Monatshefte f. Deutschen Unterricht* 35, 1943 p. 103

rences between the diverse scientific orientations toward meaning seem to depend upon whether the focus of attention is upon the semantic field or the semantic context. Semantic field is exemplified in the works of a number of scholars such as Wilhelm von Humboldt, Trier, and Porzig in Europe, and in the United States, taxonomic studies dealing primarily with folk classifications of related terms, e.g. *The Diagnosis of Disease Among the Subanum of Mindanao* by C.O. Frake, 1961, and *Lexicographic Treatment of Folk Taxonomies* by H.C. Conklin, 1962; the componential analysis of sets of vocabulary beginning with *Classificatory Systems of Relationship* by A. L. Krober, 1909, and including Jakobson's important componential treatment of case systems, 1936, F. Lounsbury's analysis of *A Semantic Analysis of the Pawnee Kinship Usage*, 1956, and Ward H. Goodenough's work on Trukese, *Property, Kin, and Community on Truk*, 1951, *Componential Analysis and the Study of Meaning*, 1956; and the analysis of semantic domains such as the work of C.F. Vogelin and F.M. Vogelin's *Hopi Domains*, are concerned with semantic field.

The studies of Malinowski, *Argonauts of the Western Pacific*, 1922; Ogden, and Richards's *The Meaning of Meaning*, 1952, and Firth's *Modes of Meaning*, 1951, are concerned with semantic context.

In 1963, Katz and Fodor tried to incorporate the factors of semantic field and context as mutually interacting forces. In their theory,

a 'dictionary' provides descriptions of the semantic fields of the various symbols and in the actual use of language, the speaker's ability to determine which of a number of terminal meanings is intended depends upon the semantic context. Their theory was quickly incorporated into an integrated theory of linguistic descriptions, Katz and Postal's *An Integrated Theory of Linguistic Descriptions*, 1964 and became a major stimulus for fundamental revisions in transformational syntactic theory (Chomsky: *Aspects of the Theory of Syntax*, 1965). Katz and Fodor's original theory, i.e. *The Structure of a Semantic Theory*, 1963, invited criticism by such people as Bolinger, Lyons, Weinreich and other people. The criticism by Weinreich will be discussed later.

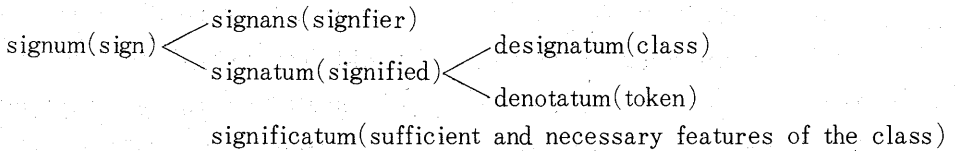
The above is a summary of the development of semantic theories in Europe and in the United States. Now I want to discuss about some of the basic notions on the semantic analysis.

According to Nida, the semantic analysis of a language attempts to explain primarily the relationship of individual words and combinations of words to nonlinguistic contexts of utterances-whether on the level of referential or emotive meaning. Referential meaning occurs between the symbols and items in the cultural context, emotive meaning is relationships between symbols and psychological reactions of the participants in the communication. Besides referential and emotive meanings, there is the linguistic

meaning which is the recurring patterns of symbols which are linked to one another in significant ways. The relationship of individual words can be studied in terms of paradigmatic relationship of signs and com-

binations of words can be studied in terms of syntagmatic relationship of signs.

In semiotics sign is explained in the following way.



The examples for the above are as follows:

concept which is very important in the development of semantic theories.

(1) designatum (class, type):

generalized meaning

chair is the name of a class for bench, stool, position, etc. which distinguishes from other possibly related class.

By the influence of Saussure's idea that "language is a system of signs," and Gestalt psychology, the atomistic method of historical semantics which was concerned with the change of meaning of single words was replaced by the field concept. The synchronic consideration of language opened new ways for the investigation of groups of words belonging conceptually together. We may say that field theory is one of the turning points in the history of modern semantics.

(2) denotatum (token, definition):

based upon the tokens of the class, the particular meaning

the *chair* in the living room, the *chair* of philosophy, the electric *chair*, he will *chair* the meeting (extensive)

The term 'field' as a linguistic term had for the first time been employed in 1924 by Ipsen, though before Ipsen, Humboldt had the same sort of ideas, but the most well-known and so far the most fertile field concept is that of Trier. He wrote several works but the most outstanding work in this sphere is *Der deutsch Wortschatz im Simbezirk des Verstandes* (1931). Trier says that fields are linguistic realities existing between single words, and the total vocabulary; Trier investigates language as *ergon* or, in the Saussurean terminology, as *langue* rather

(3) significatum: we may define *chair* by

describing the sufficient and necessary features which distinguish it from all other objects.

American College Dictionary gives definition as follows: "a seat with a back and legs or other support, often with arms, usually for only one person".

II. Semantic Field

Bearing those basic notions in mind, I want to discuss about the "semantic field"

than *parole*. He looks upon the vocabulary of a language as a closely-knit system.

Intermediate between the individual lexical items and the totality of the vocabulary, Trier recognizes the existence of several 'conceptual fields' and 'lexical fields'. For example, if we think of the continuum of color, prior to its determination by particular languages, it is conceptual field.

Different languages, and the same language at different periods of its history, can be compared in respect of the way in which they divide the continuum and give lexical recognition to greater or less area within it. For instance, the continuum of color is divided into seven categories in English and four in Hanunoo. And the form *braun* covered a wider area, including violet, of the field in the vocabulary of eighteenth century German than it does in the vocabulary of the present day.

The conceptual field exists independently of the lexical field. The lexical field is formed by a word and its conceptual cognates and corresponds to the entirety of the conceptual field. The conceptual field is divided into parts by the word *mosaic* (Wortdecks) of the lexical field. In our mother tongue we possess the knowledge of the boundaries of each single section of the word *mosaic* without being really conscious of them. If we wish to grasp the word content of foreign languages or of earlier periods of a language, we must familiarize ourselves intimately with each single part

of the word area and in so doing we become aware of the differences in field articulations from those to which we are accustomed.

Not only in his major thesis but also in some of his subsequent investigations, Trier has concerned himself with field of 'intellect'. He has succeeded in eliciting the content of German intellectual vocabulary of the Middle Ages in traditional texts. Rather than stopping at a descriptive investigation, Trier compares fields of various historical periods and of different authors and thus obtained the history of the field in question. One part of the intellectual field around 1200 is constituted and articulated by the trinity of 'wisheit', 'kunst' and 'list'. 'Kunst' is roughly speaking, the higher or courtly range of knowledge, including social behavior: 'list' is the lower, more technical range of knowledge and skill devoid of courtly distinction; 'wisheit' is not only an alternative for the other two in most of their applications, but also their synthesis, viewing man as a whole, and merging intellectual, moral, courtly, aesthetic and religious elements into an indissoluble unity. This term, typically mediaeval in its catholicity, signified 'the full maturity of a man elevated in spiritual and social standing'. This is the around 1200, in the first synchronous state. A hundred years later, the whole panorama changes. The terms dividing up the sphere of knowledge between them are still three in number, but a different three; 'wisheit', 'kunst' and

'wizzen'. It is not that *list* has been simply replaced by *wizzen*. The contents of every single term have changed, and the relations obtaining between them have also changed. *Wisheit* is no longer an alternative for the other two; and since it is now definitely religious, it finds it increasingly difficult to act as a synthetic term either. Another radical modification is the disappearance of courtly and social connotations from the 'kunst-wizzen' duality.

To sum up, we have two synchronous states:

1200	<i>wisheit</i>	<i>kunst</i>	<i>list</i>
1300	<i>wisheit</i>	<i>kunst</i>	<i>wizzen</i>

In this way Trier's book combines descriptive and historical linguistic research. In his investigations of the field of 'intellect', Trier has omitted verbal expressions. Trier has been justly criticized for his neglect of syntagmatic relations between linguistic forms of speech other than the nouns. This neglect is to some extent remedied in Porzig's theory.

Porzig finds certain 'essential semantic relationships' between verbs and nouns or between adjectives and nouns. 'To go' presupposes 'the foot', 'to grasp' presupposes 'the hand' and 'blond' presupposes 'the hair'. He thought the nucleus of such a semantic field could only consist of a verb or an adjective, because these classes of words have a predicative function and are therefore less ambiguous than nouns. One can grasp with the hand only, but one can do many things with the hand.

Trier protests against Porzig's use of the term 'field' in this new sense. Trier based his theory on the entire vocabulary, dividing it into large field units, and subdividing these until he reached the smallest entities — single words. Porzig's field, on the other hand, is conceived as primitive concrete situations linguistically designated. By means of it the speech community succeeds in grasping higher and more abstract spheres. Porzig reacts to this protest by terming Trier's field 'divisive' in contrast to his own 'inclusive'. The same word can be a unit in many kinds of relationships. For instance, *reiten* implies horses, donkeys, etc. just as *fahren* implies wagons, cars, boats, trains, etc., but *reiten* and *fahren* are also neighbors in a conceptual field from which they select parts. 'Field' is a striking linguistic term. Particularly in Trier's sense, it is indispensable in present-day linguistic discussion, but all lexical areas do not allow of such exact delimitation as do the field of 'intellect' and its subdivisions. Usually the fields of the single words overlap. The temperature scale (hot, warm, luke warm, cool, cold) cannot be as clearly delineated as the scale of grading on a school report.

The chief merit of Trier's theory is that it has evolved a new technique for the determination of the all-important but elusive force, the influence of language upon thought. By Trier's method, it is also possible to examine vertically the corresponding sections of different periods of the same

language and it is also possible to proceed horizontally and compare corresponding sections of two different languages of the same period. In English, The children are *playing* blindman's buff, but also They are *playing* chess. The German *spielen*, French *jouer* can be used similarly. Swedish, however, clearly differentiates *leka* for the first and *spela* for the second. There are problems of semantic development which cannot be satisfactorily clarified by the Trier's method. For example, the Swedish adjective *kram*, which is related to Gothic *qrammipa* refers to wet soft snow which can be rolled into balls. *Kram* cannot be used in any other connection than with snow. This peculiarity of the word *kram* is easily formulated by means of the Porzig's field.

Whereas Trier proceeds by dividing the total vocabulary first into lexical fields, to subdivide these latter into the individual words, Porzig starts from simple, concrete situations with which he associates bipartite syntagms composed of noun + verb or adjective + noun, between which certain fundamental semantic relations hold. What Porzig attempted in singling out for attention the relations of selection that hold between particular members of one major form-class and particular members of another is important.

Firth also laid great stress on what he calls the 'collocability' of forms.⁴⁾

John Lyons developed such a concept as 'field' in his recent book, *Structural Semantics*, and he tried to explain meaning in terms of such relations as incompatibility, antonymy, hyponymy, and synonymy. For instance, in incompatibility, *She wore a red dress* denies *She wore a (green, blue.....) dress*. In antonymy, there are two cases: one is the non-graded, the other is gradable (bigger than —). The example of hyponymy is *scarlet*. *Scarlet* is a hyponym of, or included in, red.

III. Componential Analysis

Componential analysis can be called distinctive feature analysis at the semantic level. In order to make the explanation clear, I want to illustrate the technique by the English kinship terminology. Effective componential analysis depends upon two major features: (1) A well-defined corpus of related terms, e.g. a kinship system, a set of case endings, or a pronominal series. (2) The possibility of finding in nonlinguistic behavior certain features which are determinate as to the basic contrast between the symbols in question. For example, *father* and *mother* in English share the component of generation older than ego but they differ as to sex. The two components of generation and sex help us to define the relationship of ego to *father* and *mother*. As we extend the number of kinship terms, it becomes

4)

J. R. Firth, "Modes of Meaning" *The Bobbs-Merrill Reprint Series in Language and Linguistics* 20 1951

evident that there are other important element, *e.g.* descending generation in *son* and *daughter* in contrast to ascending generation in *father* and *mother*, and lineality for *uncle* and *aunt* are obviously not in the same relationship to ego as are his own parents.

In making a componential analysis of any group of related words there are five basic steps.

(1) Determining the limits of a "closed corpus" of data, *i.e.* limiting the study to a well-defined set of words which have multi-dimensional relationships consisting of certain shared and contrasting features.

e.g. The English terms chosen are *grandfather, grandmother, father, mother, brother, sister, son, daughter, grandson, granddaughter, uncle, aunt, cousin, nephew, and niece.*

(2) Defining the terms as precisely as possible, on the basis of the objects involved.

e.g. For the English kinship term *uncle*, we would specify father's brother, mother's brother, father's father's brother, and mother's father's brother, etc.

(3) Identifying the distinctive features which define the various contrasts in meaning.

e.g. Differences of generation, of sex, of lineality, etc.

(a) Sex (S): male (S_1) and female (S_2)

(b) Generation (G):

two generations above ego (G_1)

one generation above ego (G_2)

ego's own generation (G_3)

one generation below ego (G_4)

two generations below ego (G_5)

(c) Lineality

(L_1) in which the person involved are direct ancestors or descendants of ego.

(L_2) (colineals) } representing two
(ablineals) } successive degrees
of less direct lineality.

(4) Defining each term by means of distinctive features. For example, *father* may be defined as first ascending generation, male, and lineal (*i.e.* direct line). If we define the meanings of kinship terms on the basis of these componential features of sex, generation, and lineality, we obtain the following type of description:

grandfather:	$S_1 G_1 L_1$
grandmother:	$S_2 G_1 L_1$
father:	$S_1 G_2 L_1$
mother:	$S_2 G_2 L_1$
brother:	$S_1 G_3 L_2$
sister:	$S_2 G_3 L_2$
son:	$S_1 G_4 L_1$
daughter:	$S_2 G_4 L_1$
grandson:	$S_1 G_5 L_1$
granddaughter:	$S_2 G_5 L_1$
uncle:	$S_1 G_{1-2} L_2$
aunt:	$S_2 G_{1-2} L_2$
cousin:	SGL_3
nephew:	$S_1 G_{4-5} L_2$
niece:	$S_2 G_{4-5} L_2$

(5) Making an overall statement of the relationship between the distinctive features and the total number of symbols classified.

This is often done by means of some "plotting" or "mapping" of the semantic space.

By componential analysis (1) attention is drawn to the distinctive features which underlie the contrast, without the distraction of many additional features which are not so basic to the functioning of the system, (2) unsuspected features or distinctions in meaning are often discovered in the process of a thorough application of such a system, and (3) the functioning of a system is revealed in its simplest terms.

As mentioned above, componential analysis of meaning has many advantages over a number of other techniques, but there are certain limitations: (1) It is only applicable to restricted series of terms which have certain shared and contrastive features. (2) By analyzing only the minimal features of distinctiveness, many supplementary and connotative elements of meaning are disregarded, for instance, the emotive meaning in *mother* in contrast with *cousin*. (3) Though the componential features are fundamental to the functioning of a system, they are often not the focal elements in the consciousness of speakers. In other words, native speakers of a language will usually recognize the validity of componential features. However, they tend rather to think about areas of meaning and the classes of items which fit into such areas rather than about the componential features which define the contrasts.

5)

Cf. Yoshiko Yamashita, "Formalization of Meaning" *English and American Studies*, 1964 The English Dept., Rissho Gakuen Women's College pp. 6-21

IV. A Semantic Theory by Katz and Fodor and Its Criticism by Weinreich

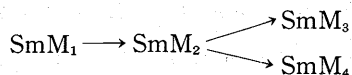
From the literature on componential analysis and semantic fields, we understand paradigmatic relations of words, that are how the meaning of a word in a vocabulary is determined by the meanings of other words in the same vocabulary. However, an account must be made for how syntagmatic relations of the meaning of a sentence are composed out of the meanings of individual words. The theory proposed by Katz and Fodor in *The Structure of a Semantic Theory*⁵⁾ (hereafter abbreviated KF) was an attempt to provide such an account in the framework of a particular, highly rigorous and fruitful concern with syntax.

In his article *Explorations in Semantic Theory*, Weinreich develops his semantic theory, criticizing the theory KF first, and proposing the alternative solutions later. As he states toward the end of his article, the main stimuli which made him develop his new semantic theory are his realization that a semantic theory is of marginal interest if it is incapable of dealing with poetic uses of language and more generally, with interpretable deviance, and the demonstration by Noam Chomsky of the theoretical potentialities which the feature concept offers. Chomsky introduced the feature concept into syntax in *Aspects of the Theory of Syntax*, by eliminating a formal discontinuity between lexical meanings in feature-form and syntactic meanings formulated as

subclassification.

According to KF, the goal of a semantic theory is to account for certain aspects of human competence with respect to a language. To carry out this goal, KF visualizes a semantic description of a language as consisting of two types of components: a dictionary and a set of projection rules. The dictionary contains statements of meanings of words each entry being in principle polysemous. The projection rules specify how the meanings of words are combined when the words are grammatically constructed, and, in particular, how the ambiguity of individual words is reduced in context. For instance, if a sentence consisting of words A + B + C, the dictionary gives two meanings for A, three for B, and three for C. By multiplying $2 \times 3 \times 3$, we calculate that the sentence should be 18 ways ambiguous. But in fact, it turns out that the sentence is only three ways ambiguous. The major function of the projection rules is to account for the reduction of the ambiguity for 18 to 3. The limiting case is one in which there is no interpretation of a sentence, even though its components in isolation do have at least one, and possibly more meanings each. Dictionary entries contain (i) a syntactic categorization which consists of sequence of one or more syntactic markers such as Noun, Noun Concrete, Verb, etc., (ii) a semantic description which consists of a sequence of semantic markers and a semantic distinguisher, and

(iii) a statement of restrictions on its occurrence. The semantic markers constitute those elements of a meaning upon which the projection rules act to reduce ambiguity. Polysemy of an entry appears in the normal form as a branching in the path of semantic markers.



Correspondingly, reduction of ambiguity is represented as the selection of a particular path (e.g. $\text{SmM}_1 \rightarrow \text{SmM}_2 \rightarrow \text{SmM}_4$) out of a set of alternatives. The distinguisher contains all the remaining aspects of the meaning of an entry. The selection restriction (iii) at the end of an entry specifies the context in which the entry may legitimately appear. The context of an entry W is described in terms of syntactic and semantic markers, either positively or negatively.

Weinreich criticizes KF summarized in the previous page in the following way.

(1) The domain of the goal which KF staked out for semantics is relatively narrow: it does not include the human ability to name objects correctly, to distinguish synthetically true statements from synthetically false ones, or to perform other referential tasks. KF is concerned with an extremely limited part of semantic competence *i.e.* the detection of semantic anomalies and the determination of the number of readings of a sentence.

(2) Semantic Markers vs

Semantic Distinguishers

There are two criteria to establish a hierarchy among the after analyzing a global meaning into components. One criterion for hierarchization has been the isolation of designation or connotation for study by linguistics, while relegating mere reference or denotation to some other field. A further criterion within the elements of designation has been used in studies of such areas of vocabulary as can be represented as taxonomies. The hierarchization of semantic features into markers and distinguishers in KF does not seem to correspond to either of the conventional criteria. Although KF says, 'markers reflect whatever systematic relations hold between items and the rest of the vocabulary of the language and distinguishers do not enter into theoretical relations', KF also says, 'certain semantic relations among lexical items may be expressed in terms of interrelations between their distinguishers'.

(3) Path vs Selection Restrictions

Selection restriction (Aesthetic Object) for *colorful* at the end of one of the paths would indicate that the adjective, in the sense corresponding to the path, is applicable as a modifier without anomaly only to head nouns which contain the marker (Aesthetic Object) in their paths. If we consider the case of *pretty*, it seems to be applicable to inanimates and, among animates, to females. If its selection restriction were stated as $\langle(\text{Inanimate}) \vee (\text{Animate}) + (\text{Female})\rangle$, the

nomality of *pretty girls* as well as the anomaly of *pretty boys* would be accounted for, since *girls* has the marker (Female) in its path, while *boys* does not. But we can also say *pretty children*. If we write $\langle(\text{Inanimate}) \vee \sim (\text{Male})\rangle$ it is read predictable of Inanimates and not predictable of Males. This would explain why *pretty children* is not anomalous, but would not yet show how we infer that the children are *girls*, since the projection rules only check on whether the conditions of selection restriction are satisfied, but transfer no information from the angle-bracketed position to the amalgamated path. This is explained in terms of 'Transfer Features' in Weinreich's new proposal.

(4) The elements of an amalgamated path in KF, like those of the constituent paths are strictly unordered sets. Given the separate paths for the English words *detective* and *woman*, the constructions *woman detective* and *detective woman* would be represented by identical amalgamated paths, since the order of elements in a path, and hence of subpaths in a path, is theoretically immaterial. Two sentences such as *Three cats chased a mouse.* and *A cat chased three mice.* would also receive identical semantic interpretations ('reading'). Accordingly, for KF, the meaning of a complex expression is an unstructured heap of features, just like the meaning of a single word. Concerning how is the difference in grammar concretely related to the difference in total meaning,

KF is silent. Linking and Non-Linking Constructions give solution in Weinreich's theory.

(5) Infinite Polysemy

KF-type dictionary is in danger of having to represent an unlimited differentiation of meanings. For instance, when one considers the phrases *eat bread* and *eat soup*, one realizes that *eat* has a slightly different meaning in each phrase: in the latter expression, but not in the former, it covers the manipulation of a spoon. Continuing the procedure applied in KF to polysemous items such as *ball* and *colorful*, one would have to represent the dictionary entry for *eat* by a branching path, perhaps as follows:

eat $\longrightarrow \dots \longrightarrow$ (Action) $\longrightarrow \dots \longrightarrow$
 (Swallow) $\begin{cases} \longrightarrow$ (Chew) $\longrightarrow \dots \langle$ (Solid) \rangle
 \longrightarrow (Spoon) \langle (Liquid) \rangle

The selection restrictions at the end of each subpath would provide the information which makes possible the choice of the correct subpath in the contexts of bread and soup, but the activity symbolized by *eat* is also different depending on whether things are eaten with a fork, or with one's hands.

(6) Projection Rules

If there is such a sentence as $A \rightarrow M \langle \mu \rangle + N \langle \nu \rangle$, where M and N are lexical strings with their associated sets of syntactic markers, and μ and ν are their respective selection restrictions, there are four possible restrictions on the selections of the construction, A, as a whole as follows:

- (i) $A \langle \mu, \nu \rangle \longrightarrow M \langle \mu \rangle + N \langle \nu \rangle$
- (ii) $A \langle \mu \rangle \longrightarrow M \langle \mu \rangle + N \langle \nu \rangle$
- (iii) $A \langle \nu \rangle \longrightarrow M \langle \mu \rangle + N \langle \nu \rangle$
- (iv) $A \longrightarrow M \langle \mu \rangle + N \langle \nu \rangle$

A may retain the restrictions of both constituents (i), or of the left constituent (ii) or of the right constituent (iii); or it may be unrestricted (iv). If KF, projection rule 1 is a rule of type (iii); rule 3 is of type (ii); rule 2 and 4 are of type (22iv). No rule of type (i) is cited, but there appears no reason to exclude its occurrence in principle. The function of the KF projection rules is to classify all binary constructions, terminal as well as preterminal, of a grammar into four types according to the deletion or non-deletion of the selection restrictions of their right and left constituents. Except for the differential effects on selection restrictions, the power of all projection rules is the same: namely to sum up the paths of the constituents. Consequently, the classification of constructions by PRs could easily be shown within the categorial part of the syntax, so that no separate PR component would be necessary. The above (i) is explained in terms of Non-Linking Constructions in Weinreich's theory.

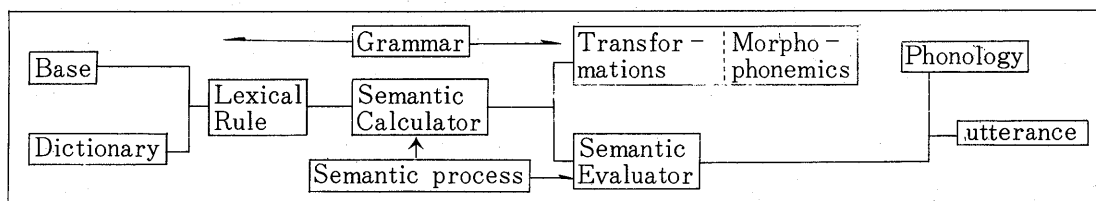
(7) KF contains a component (the projection rules) which automatically selects the fully grammatical interpretation, provided there is one. Thus the theory is too weak to account for figurave usage and for many jokes. KF cannot represent the ambiguity between a grammatical and a deviant sente-

nce. Semantics begins where syntax ends in KF, whereas, in Weinreich's new theory, deviant utterances are explained in terms of Calculator and Evaluator before the last syntactic rule has been applied. This point is very crucial in his theory.

V. A New Semantic Theory by Weinreich

According to Weinreich's new proposal, the goal of a semantic theory of a language is to explicate the way in which the meaning of a sentence of specified structure is derivable from the fully specified meanings of its parts. The semantic structure of sentence components is given in terms of semantic features. The form of grammar with which the semantic theory developed here is meant

to be compatible is that which Chomsky (1965) has most recently proposed. A grammar of this form contains a base and a transformational component. The base generates deep structures of sentences, upon which the transformations operate to produce surface structures of sentences. Base in turn consists of a categorial component, which generates preterminal strings, and a dictionary, which contains lexical entries. A lexical entry may be considered as a triplet (P, G, μ) , in which P is a set of phonological features, G a set of syntactic features, and μ a set of semantic features. The structure of a new semantic theory proposed by Weinreich can be represented as follows:



The elements operate in the following way in order to generate semantic interpretation.

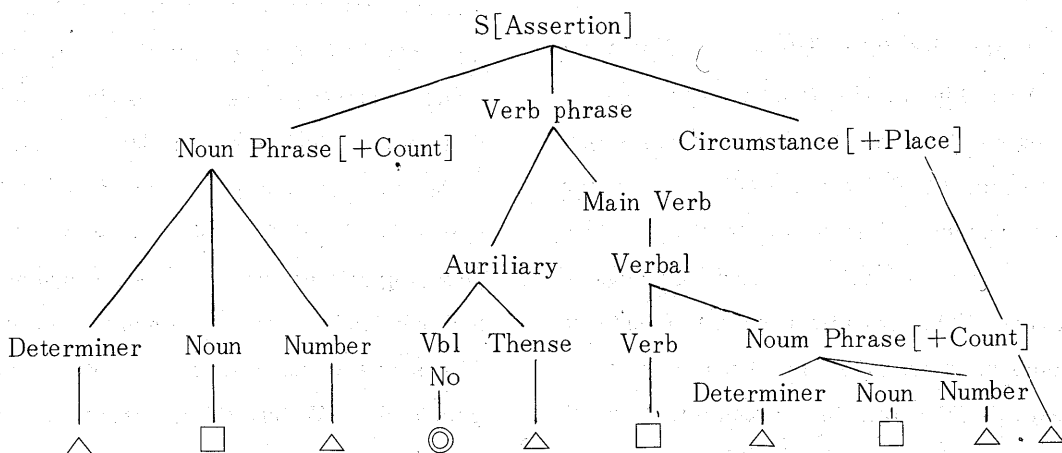
(1) The base of the grammar consists of a series of branching rules with recursive power. The rules are defined on an alphabet containing symbols of three types: category symbols, complex symbols, and dummies. A complex symbol is a category symbol paired with a matrix of semantic features. The category symbols include such symbols as Noun Phrase, Circumstance, Adjective. There are three dummy symbols: \square , \triangle , and

\circ , into which all category symbols are mapped. The base generates preterminal strings. A preterminal string consists of a sequence of dummy markers and associated tree with nodes labelled by category or complex symbols. The preterminal string generated by the base is, jointly with the dictionary, the input to the Lexical Rule.

(2) The dictionary is an unordered set of morphemes. Some morphemes are triplets (P, G, μ) in which P is a sequence of phonemes, G is a syntactic marker, and μ is a

cluster, or configuration of clusters, of semantic features. Other morphemes are pairs (P, μ). The Lexical Rule maps each occurrence of Δ into a triplet (P, G, μ) and each occurrence of \square into any morpheme.

The output of the Lexical Rule – a Generalized Phrase-Marker – is a string of morphemes and occurrences of the dummy \odot with an associated labelled tree as follows.



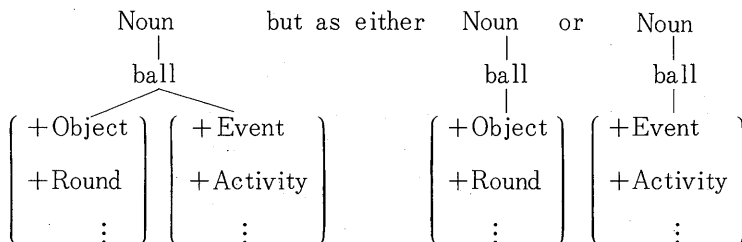
(3) Generalized Phrase-Markers next undergo dual treatment: The sequence of phonemes along with the associated labelled tree undergoes a process which converts it into a surface structure and, ultimately, into a phonetic representation of an utterance, through Transformations and Morphophonemics and Phonological Rules.

(4) The Generalized Phrase-Marker is also submitted to a Semantic Process, which in turn consists of two parts. The Calculator distributes certain semantic features along branches of the tree (Redistribution Rule); marks the sentence for contradictions between certain semantic features (Construal Rule); conflates redundant features (Conflation Rule) and transfer some features from one morpheme to another

(Transfer Rule). It also deletes certain parts of the underlying marker. The Evaluator takes cognizance of the normality or deviancy of the sentences and depending on its 'setting', emits an interpretation of the sentence to be synchronized with the phonic event, or emits a nonsense 'signal' and blocks the interpretation.

Weinreich follows Chomsky on the important principle that the transformational processing contributes nothing meaningful to a sentence, and that the operations of the semantic component, leading to the semantic interpretation of a sentence, should be defined entirely on the deep structure of the sentence. Weinreich wishes to prevent lexical entries from contributing ambiguities so that a deep structure as a whole may

be free of ambiguities. He stipulates that a lexical entry be so defined that its component — the set of its semantic features — is free of disjunctions. A polysemous or homonymous word (such as *ball*) will be



The problem of guessing which disjunction-free subset of semantic features associated with a polysemous phonological form was assigned to a particular deep structure by the lexical rule is a matter of hearer performance.

In connection with inadequacies of KF mentioned in pp. 10–13 the notions of Linking and Non-Linking, Transfer Features, Semantic Calculator, and Semantic Evaluator are crucial in understanding his new solution. These notions will be discussed one after another.

(1) Linking and Non-Linking

There are two kinds of relations, ordered and unordered, for sets of semantic features. An ordered set of features is called a *cluster* and an unordered set a *configuration*. These are represented as follows:

- (a, b are semantic features)
- Cluster: (a, b) = (b, a)
- Configuration: (a → b) ≠ (b → a)

Suppose the meaning of *daughter* is analyzed

represented in the theory by as many entries as it has meanings. Suppose there is a preterminal string with a node Noun. A lexical rule rewrites Noun not as a disjunctive set or features like

into the components 'female' and 'offspring'. Anyone who is a daughter is both female and offspring; he represents the features 'female' and 'offspring' as a *cluster*. But suppose the meaning of *chair* is represented in terms of the features 'furniture' and 'sitting'. Whatever is a chair is 'furniture' but it is not sitting: it is to be sat on. This fact is represented by saying that the features 'furniture' and 'sitting' form a configuration. Componential analysis in semantics has so far been restricted almost entirely to clusters (unordered sets) of features. Two (or more) clusters of features may in turn form a configuration. The formula (a,b → c,d) represents a configuration of the clusters (a,b) and (c,d). It is a basic tenet of his approach that the semantic structures of complex expressions and of simplex expressions are in principle representable in the same form, *viz.*, in terms of clusters and configurations of semantic features. In other words, definitions of

words have semantic structures of the same general form as sentences of a language. Suppose two expressions enter into a grammatical construction. He calls linking the formation of a cluster of features. Let M be a word with the semantic features (a → b), and N a word with the features (c → d); and

$$\begin{aligned} \text{(i) } M(a \longrightarrow b) + N(c) &= MN(a \longrightarrow b \rightarrow c) \\ \text{(ii) } M(a \longrightarrow b) + N(c \longrightarrow d) &= MN(a \longrightarrow b \rightarrow c \rightarrow d) \\ \text{(iii) } M(a, b) + N(c, d) &= MN(a, b \rightarrow c, d) \end{aligned}$$

In KF, all constructions are superficially represented as Non-Linking, but are actually treated as Linking. The following English constructions are linking. Subject Nouns and Main Verbs, Subject Nouns with Predicate Nouns and Predicate Adjectives, Main Verbs with Manner Adverbials, Descriptive Adverbs with Adjectives. Non-Linking Construction is further subdivided into Nesting, Delimitation and Modalization. Like the Linking Constructions, the Nesting Constructions of a language are given by enumeration. The constructions in English which involve nesting are Main Verb + (Object) NP and Preposition + (Object) NP, as well as the various Complements. Verb here includes certain complexes of Verb + Particle (e.g. wait + for, wait + on, etc.). The temporal and locative phrases which accompany 'verbs of duration' and 'verbs of movement' (e.g. walk home, reach America, last hours, etc.) are perhaps also interpretable as Nesting arguments. In Delimitation, Quantification – both numerical (five sheep) and non-num-

let MN be a construction; then MN is a linking construction if the semantic structure of MN is, say (a, c → b → d). A construction in which the feature of the constituents form no fresh cluster is non-linking. The following formulas exemplify some non-linking constructions:

erical (some sheep) and Deixis, whether by focus of attention (these sheep = such sheep as are in the interlocutors' focus of attention) or unity or discourse (the sheep = such sheep as are mentioned in this discourse) are involved. Such expressions as *so-called, like, or so*, are called Modalization which seems to be distinct from Nesting as well as from Delimitation. It can be viewed as an instruction to interpret the constructed semantic entity not literally, but with some quantification, such as suspension of belief about the truth of an assertion or a disclaimer of responsibility for its truth.

(2) Transfer Features

Weinreich commented on the KF analysis of selection restrictions. The fact that *pretty* is not normally applicable to Males could be stated as part of the dictionary entry for *pretty*. However, it was also apparent that when the proper context is unspecified as to [± Male]; the word *pretty* itself specifies it as [- Male]. [- Male] in the

case of pretty is called a Transfer feature and symbolized by angular brackets. Suppose $M(a, b \rightarrow)$ and $N(c, d)$ are provisionally formulated dictionary entries, and $M + N$ is a Nesting construction; then the meaning of $M + N$ is represented by $(a, b \rightarrow c, d)$. But suppose we find that when $N(c, d)$ is constructed with $M(a, b \rightarrow)$, a semantic feature W appears which clusters with (c, d) . Thus W may be represented as a 'transfer feature' of M , as follows:

Given: $M(a, b \rightarrow \langle W \rangle)$; $N(c, d)$
 Then: $M + N(a, b \rightarrow c, d \ W)$

Other examples of a transfer feature in English are: [+ Time] in the preposition *during* or the postposition *ago*; [+ Water vehicle] in *sail*. In the latter case, when the feature is transferred to *ship*, it adds no new information. The transfer features of his theory correspond to Chomsky's selectional features. In Chomsky's grammar, it was ascertained whether the selectional features of the verb correspond to the inherent features of the nouns in its environment, but in Weinreich's theory, a transfer feature functions more actively by transferring the feature from the verb to the nouns.

(3) Semantic Calculator

One of the semantic processes is operated in Semantic Calculator in the following way. The Generalized Phrase-Marker (= terminal string) is the input to the following ordered set of obligatory semantic rules. The Generalized Phrase-Marker is obtained in terms of combining the preterminal string (as

shown in p. 14 in this paper) with the dictionary by the following Lexical Rule. (This process is pre-semantic process.)

(Minor Classes:) If Δ and A are symbols in a preterminal string, such that A immediately dominates Δ ; and if $(P, \langle G \rangle, [\mu])$ is a morpheme (where P is a sequence of phonemes, $\langle G \rangle$ is a syntactic marker, and $[\mu]$ is a set of semantic features), replace Δ by $(P, \langle G \rangle, [\mu])$ provided $A = \langle G \rangle$

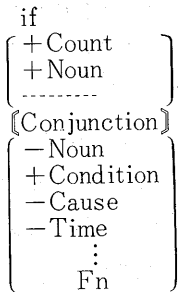
(Major Classes:) If \square is a symbol in a preterminal string and $(P, \langle G \rangle, [\mu])$ is a morpheme (in which $\langle G \rangle$ may be null), replace \square by $(P, \langle G \rangle, [\mu])$.

The reason why Minor Classes and Major Classes are separated is that minor-class slots are filled only by appropriate minor-class morphemes, whereas major-class slots are not necessarily filled by morphemes of the appropriate major-class. The Lexical Rule thus permits not only fully grammatical terminal strings such as (i) *The journalists will confirm the rumor.*, but also deviant strings such as (ii) *The journalists will true the rumor.* (in which *true* [+ Adjective, ___Verb, ...] is inserted in a \square dominated by Verb) and (iii) *Scientists study the if.* (in which *if* [Conjunction]... is inserted in a position dominated by Noun). This contradiction is eliminated by Construal Rule later.

a) Redistribution Rule

All semantic features from each complex symbol are distributed 'downwards' into the lexemes to form clusters with the (first)

cluster of features provided for the lexeme by the dictionary. As the result of applying this rule, *if* in the sentence (iii) *Scientists study the if*. becomes to have the following features. Above the line of dashes are shown the features derived by the operation of the redistribution rule; the features drawn from the dictionary appear below the dashes.



The contradiction between [+ Noun] which was derived from the dominated category in

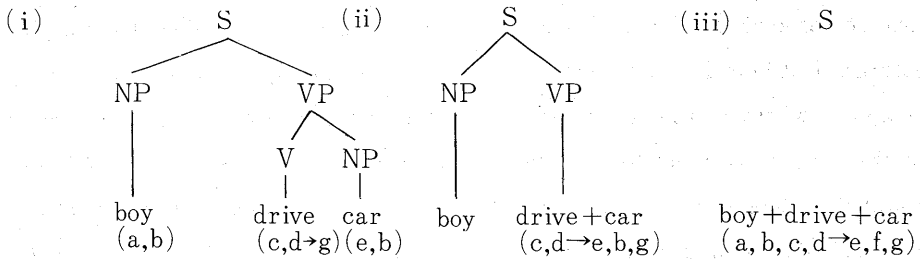
the sentence *Scientists study the if*. and [- Noun] which a dictionary contains is eliminated by Construal Rule here.

b) General Concord Rule,

c) The Transfer Rule,

d) the rule for idiomatic lexemes are discussed with rigorously formulated rules, but I will omit the discussion because of the limit of papers.

e) The Linking and Nesting Constructions are discussed in the following way. If NP \leftrightarrow VP is a linking construction and V \rightarrow NP is a nesting construction, the Linking and Nesting Rule may be applied to the schematized structure (i), under the convention that it works cyclically from the bottom up. It thus converts (i) to (ii) and then to (iii):



But if *boy* is subject to delimitation by a Determiner (e.g. *this boy*), and if the VP is delimited, e.g. as to time (Past + *drive + car*), the overall meaning of the sentence may have to be represented by an irreducible expression schematized as follows: ζ (a, b) ζ (c, d \rightarrow e, f, g)

f) Conflation Rule

Although the dictionary contains no lexemes

with either tautologous or redundant features, the development of tautologies or contradictions is possible by the operation of the Redistribution Rule and the Transfer Rule. Accordingly it is necessary to have Conflation Rule which eliminates tautologies (redundancies) and g) Construal Rule which eliminates contradiction.

(4) Semantic Evaluator

The function of the semantic evaluator is primarily to compute a quantitative measure of the deviance of a sentence from normality. One way of achieving this would be to compute a binominal index p/q , in which p would be the number of DEV (deviance) symbols generated by the operation of the Construal Rule, and q would be the sum of the numerical indices of all occurring DEVs. A sentence evaluated as $0/0$ would then be completely normal. This quantitative evaluation of an expression is but the last phase in the characterization of the degree of its deviance. The qualitative nature of its deviance, however, is already characterized by the sections of the Construal Rule which were obligatorily applied to it.

Deviance is tolerated in different degrees, depending on the occasion and purpose of the discourse and the imaginative capacity of the speaker and hearer. When language is used for poetic purposes, a raised level of deviance is tolerated. We may conceive of a discourse (a dialogue, a literary work, a genre, etc.) as governed by a 'setting' of the Evaluator for a particular range of values of p/q . This setting may be provided by the Stylistic Theory. If a sentence exceeds the permitted upper value of p/q , it is marked as Nonsense; otherwise it yields a semantic interpretation which is synchronized with the phonetic representation of the sentence.

(5) Deviant Utterances

The classification and analysis of deviant

utterances is a sure indicator of the way in which linguistic phenomena are apportioned between syntax and semantics. According to Weinreich, (a) Violations of transformational and morphophonemic rules yield 'purely' grammatical deviations; (b) Violations of rules in the Calculator yield 'purely' semantic deviations; and (c) Violations of rules of the categorial component of the grammar yield both grammatical and semantic deviations, since those rules are involved in semantic features as well as grammatical components.

VI. Conclusion

In this paper, I tried to trace the trend of the study of meaning examining various semantic theories. The focus of attention was put on the field concept exemplified by Trier, Porzig and Lyons in Europe, and componential analysis in the United States. The paradigmatic relations of the semantic features have been clarified by these studies, but the syntagmatic relations must be studied and formulated. The theory proposed by Katz and Fodor was the first attempt to synthesize those two axes of relations, but serious criticism has been raised by Weinreich as discussed in the latter half of my paper. As the diagram of his theory shows, he does not want to begin semantics where syntax ends, as proposed by Katz and Fodor. His theory aims at the explication of deviant utterances as well as normal ones. If the theory proposed by Weinreich can be

applied to many languages and be proved its universality, it is encouraging for the further study of meaning. The methods applied for componential analysis and semantic field analysis are very useful as a heuristic tool for the semantic analysis.

Although it is still under the process of development, I realize that semantics occupies a very important place in linguistics with its close relation to syntax. We cannot also neglect the keen interest for a translation machine in recent years. In relation to stylistics and psychology, the study of meaning from the point of view of linguistics must be very important and interesting.

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