Chapter III

THE MODIFIED STRUCTURALIST APPROACH

Uttering a word is like striking a note
on the keyboard of the imagination.

--Ludwig Wittgenstein

3.1 EVIDENCE FROM PSYCHOLOGY

Linguistics is, of course, not the only field which is dominated by a set-theory model of categorization. This model of categorization is prevalent throughout the sciences, all of which take their cues from mathematics. Likewise in psychology, human cognitive categorization has traditionally been assumed to be set-theoretical in nature. Since human cognitive categories are precisely what natural language encodes, a theory of human cognitive categorization should be easily translatable into a theory of linguistic categorization. In fact, there should be no significant discrepancies between the two -- our best psychological theory of categorization should closely parallel our best linguistic theory of the same. Indeed, these two branches of science maintained virtually identical theories of categorization until the early 1970's, when the need for change was recognized by a group of psychologists, thus creating a gap that only a few linguists have recently begun to bridge.

Eleanor Rosch, a psychologist at the University of California, Berkeley, questioned the set-theoretical model of cognitive categorization in a series of articles (1973a, 1973b, 1978, Mervis and Rosch 1981) and presented various types of experimental evidence which contradicted this model. Her aim was to test whether certain properties of classical sets -- a) clear-cut boundaries, b) all members have equal status, c) membership determined by presence vs. absence of defining attributes -- were indeed present in human cognitive categories. The results of Rosch's research did not support the presence of any of these properties in cognitive categorization. She taught primitive peoples who lacked linguistic terms for colors and for basic shapes arbitrary categories involving these elements (1973a), and discovered, contrary to b) above, that categories have prototypes (i.e., "best examples") and, contrary to c), that subjects "define" a category as a group of variations on the prototype rather than by isolating primitives or attributes and using them as criteria for determining category membership. In another series of experiments conducted in the U.S., subjects were asked to rate the membership of various objects to given categories. Rosch discovered, contrary to a), that categories do not have absolute boundaries. Questions about centrality or peripherality of category membership were found to be meaningful to subjects; such questions could be answered quickly, and subjects agreed with each other in their ratings of instances.

In addition to exposing the inadequacies of the traditional theory, Rosch describes a theory suggested by her research (Mervis and Rosch 1981, Rosch 1978), briefly outlined below:

--Categories are usually processed holistically; they are internally structured by gradients of representativeness and their boundaries are not necessarily definite.
--All members are not equally representative of their category, poorer members are likely to contain attributes from the correlated attribute clusters of other categories.
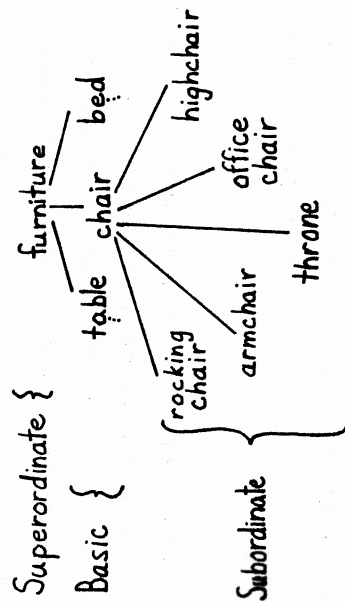
The most significant and surprising claim of her theory is that, although traditional reductionism demands that the smallest indivisible elements be discovered and recognized as the primitives or basic building blocks of any system, in cognitive categorization this is not the case. Rosch identifies what she calls the "basic level," which does not contain primitives and is "simple" not in the reductionist sense, but in a cognitive sense.

"The basic level is the most general level at which a) a person uses similar motor actions for interacting with the category members, b) category members have similar overall shapes, and c) a mental image can reflect the entire category. The basic level is the one at which adults spontaneously name objects. Labels for basic level categories are unmarked linguistically -- that is, words at this level are used in normal everyday conversation."

Categories are gestalts and are therefore not composed of primitive building blocks. On this point Rosch's work echoes the more impressionistic writings of Wittgenstein (1953): "'Simple' means: not composite. And here the point is: in what sense 'composite'? It makes no sense at all to speak absolutely of the 'simple parts of a chair.'"

The basic level is an intermediate level on a vertical scale of inclusiveness. The basic level category *chair*, for instance, is included in the superordinate category *furniture*, and itself includes subordinate categories such as *office chair, lawn chair, highchair* (see Figure 4). Rosch's subjects first recognized objects as members of their basic level category. According to her, identifying objects as members of superordinate or subordinate categories required additional cognitive processing.

Figure 4: Rosch's levels of categorization

Superordinate { furniture

Basic { table   chair   bed

Subordinate { rocking chair   armchair   office chair   throne   highchair

Rosch called not for minor adjustments in the classical set theory of categorization, but for an entirely new theory. The model that she formulated did not incorporate any of the basic assumptions of set theory, rather it was founded on experimental results which contradicted these assumptions. Significantly, Rosch claimed that

criterial attributes (which linguists often refer to as "invariants") are not decisive in the definition and identification of categories and their members.

The concepts behind Rosch's "natural categories" were not unique or unprecedented. In addition to Wittgenstein, cited above, Fillmore (1975) lists a number of scholars of various fields who were toying with related ideas in 1952-1973. Rosch's work is significant rather for a) her lucid explanation of the basic concepts involved, b) the research that backs them up and c) the degree of acceptance which her work enjoyed. It is for these reasons that Rosch's work in particular constitutes a prominent milestone in the development of what I will henceforth refer to as the cognitive approach to meaning, and which will be incorporated in the modified structuralist approach according to which Russian verbal prefixes will be analyzed in this dissertation.

3.2 EVIDENCE FROM LINGUISTICS

Since all linguistic categories of natural languages are of necessity cognitive categories, the implications of Rosch's theory of human cognitive categorization for semantics are obvious. Predictably enough, Rosch's work has not gone unnoticed in the linguistic community. Several linguists, whose work is briefly reviewed below, are exploring the applications of Rosch's findings to linguistics in an attempt to build a theory of meaning on her foundation.

3.2.1 Fillmore

Among the first linguists to cite Rosch was Fillmore (1975) in "An Alternative to Checklist Theories of Meaning." He discussed the advantages of a theory of meaning whose central concept is the prototype over one whose central concept is "checklists" of criterial attributes. The ideas expressed in this brief paper were further developed in Fillmore 1978. This article touches on a wide variety of issues concerning the function of meaning in language, but its main focus is on the inadequacy of checklist theories of meaning (i.e., discrete semantic feature theory) in describing natural language. He concludes with a discussion of legalese, which exemplifies what can happen when checklist semantics are forced upon language. Fillmore (1982) explores the actual applications of natural categories to semantics in "Towards a Descriptive Framework for Spatial Deixis."

3.2.2. Kay and McDaniel 1978 and Coleman and Kay 1981

Kay and McDaniel 1978 is a cross-linguistic study of the color categorization systems of ninety-eight languages. In part it reduplicated Rosch's finding that it is easy to select best examples (prototypes), but difficult to delimit exact boundaries between categories. Kay and McDaniel found the discrete semantic feature theory and the set theory model inadequate for the phenomena of color semantics they observed. They did not, however, accept Rosch's model as a whole, but suggested instead that fuzzy set theory (in which there are sets having boundaries, albeit fuzzy ones)

might be a desirable model for semantic categorization. Indeed, for the limited purposes of describing color semantics, fuzzy set theory may well be sufficient, although Lakoff (1982) later argued that it cannot account for more complex semantic systems.

Coleman and Kay (1981) tackled the semantic category of the English word *lie* (conventionally defined by Webster as 'to utter falsehood with an intention to deceive'). First they isolated various properties associated with this word, such as "A tells a falsehood," "A knows that he is telling a falsehood," "A intends to deceive B," and then constructed a series of stories containing all possible combinations of presence and absence of the given properties. The stories were then presented to consultants who rated the narrated events as to how well they fit their conception of the word *lie*. Coleman and Kay discovered that the properties which they had isolated were not necessary and sufficient conditions, but rather attributes of a prototype, which "associates a word with a prelinguistic cognitive schema or image, and speakers are equipped with an ability to judge the degree to which an object matches this prototype schema or image."

3.2.3 Langacker

Langacker (1982) is in the process of laying the foundation of a theory of grammar, called cognitive grammar, applying Rosch's natural categories to linguistics. Langacker rejects theories of grammar based on mathematical models, since he recognizes that there

are fundamental differences between mathematical theories and normal human cognition. It is the assumption that grammar has an existence independent of cognitive functioning which, according to Langacker, prevents generative grammar from achieving a "natural" desciption of language. He likewise eschews linguistic descriptions which "seek simplicity at the expense of factuality," thereby dealing "with the data in a way that does violence to its intrinsic organization." Langacker neatly summarized the paradox inherent in the criterial attribute model (discussed in Chapter 2):

> "The criterial attribute model is faced with a dilemma. Either it ignores these uses (i.e., instantiations such as *giant baseball, orange baseball, exploded baseball* which do not fit a narrow definition of the word *baseball* -- LAJ), thereby giving a distorted and drastically oversimplified account of human categorical behavior, or else it accommodates these judgements by loosening the defining criteria, in which case there is no non-arbitrary stopping point and the loosened criteria will hardly serve anymore to distinguish the members of a class from other entities."

Langacker adopts the prototype as an appropriate model of meaning as well as Rosch's intermediate basic level: "No specific claim is made to the effect that the smallest units of linguistic significance are necessarily primitives." His stated goal is to provide a linguistic description which is psychologically real.

Although Langacker's work is at present in progress, it represents a serious endeavor to realize the full potential of Rosch's concepts in the field of linguistics.

3.2.4 Lakoff

Lakoff has not undertaken as ambitious a project as Langacker, but his writings contain the most elegant analysis to date of Rosch's concepts in linguistic terms. In 1977 he wrote "Linguistic Gestalts."

Citing Rosch's work, he described categories as Gestalts, which have, among others, the following properties:

1. they are both holistic and analyzable, but the wholes are equal to more than the parts

2. they have variable analyses

3. they have internal relations among parts, grouped by type.

In a paper entitled "Categories and Cognitive Models," the original version of which appeared in a collection called *Linguistics in the Morning Calm*, Lakoff returned to the exploratory work done in "Gestalts" with a thorough examination of Rosch's natural categories. He identified the properties characteristic of set-theory semantics and gave examples of phenomena for which set-theory categorization is unable to account. In addition, carried Rosch's work one step further by actually defining the prototype, which he calls an "Idealized Cognitive Model" (ICM), and describing its function. ICMs have the following characteristics:

--They are structured wholes.

--The categories used in ICMs are the natural categories described by Rosch, not the classical categories of set theory.

--In addition to propositional content, ICMs may contain mental images, not just visual images, but kinaesthetic images of all kinds.

--ICMs provide holistic ways of "framing" situations, where a "situation" is taken to be an otherwise fragmentary understanding of either the real world or some imaginary or fictional world.

ICMs are based not on the objective world, but on human experience of it, and are kept distinct from both. Lexical items are both defined relative to ICMs and motivated by their existence, The ICM emerges as a very powerful concept in cognitive semantics. Interestingly, Lakoff points out that although ICMs represent a system of sorts, some of them contradict one another, but this inconsistency is in fact necessary, since different ICMs must capture opposing aspects of a given object or concept. For example, the ICMs of the words *stingy* and *thrifty* both contain an evaluation of the pros and cons of spending money, yet their evaluations are contradictory. Lakoff even suggests that the traditional application of mathematical theories to human cognition may itself stem from an ICM: "Perhaps all of objectivist metaphysics derives from an idealized cognitive model that we use in dealing with physical objects."

In a joint publication with Zoltán Kövecses (1983), Lakoff provides a cognitive model of *anger* in American English to illustrate the application of cognitive semantics.

3.2.5 Brugman, Lindner, and Rudzka-Ostyn

Several individuals have used the skeletal frameworks worked out by the linguists discussed above to delve into the meaty semantics of linguistic units closely parallel to Russian verbal prefixes. The first of these was Brugman (1981) who examined the variety of instantiations of the English verb particle over. Subsequently Lindner (1982) presented a dissertation on the particles up and out. Their results are very similar and of particular relevance to the present dissertation due to the fact that verbal particles fill roughly the same role in English as verbal prefixes do in Russian. It comes as no surprise that traditional semantic descriptions of English verb particles bear a marked resemblance to those of Russian verbal prefixes. Like prefixes, particles are traditionally portrayed as groups of homonyms, containing some percentage of semantically "empty" members. It was the recognition of flaws in the traditional descriptions similar to those discussed in Chapters 1 and 2 which inspired these papers. Brugman and Lindner discovered that the meaning of particles can be felicitously captured by a series of image schema (or, configurations) linked to one another. The image schema diagram deictic spatial relations. Each schema serves a group of instantiations, both concrete spatial ones and their metaphorical extensions. Some schema are more central than others. Both Brugman and Lindner suggest that these schema somehow fit together in a unified system, but neither actually presented such a system. Lakoff later pieced together a partial network for over using Brugman's schema.

Rudzka-Ostyn (1983a, 1983b) has written on Dutch and Polish verbal prefixes, after Brugman's and Lindner's examples. In addition to diagramming and comparing the schema networks of prefixes of these two languages, she has analyzed the phenomenon of metaphorical extension in some detail.

The work of these three authors has prepared the ground for the analysis of Russian verbal prefixes which I will present in Chapters 5 through 8.

3.2.6 Summary of impact of cognitive psychology on linguistics

Although it is not possible at this point to say that Rosch's research in cognitive psychology has stimulated a major trend in contemporary linguistics, it is clear that there is a movement afoot, at least among certain linguists, to recognize the validity and relevance of her ideas. Significantly, these concepts are not merely being mechanically transferred from psychology to linguistics, but are evoking substantial creative thinking in the process. Fillmore, Lakoff, and, most demonstrably (because he is undertaking the writing of a new theory of grammar) Langacker have been moved to question the nature of linguistics as a whole in light of these concepts. Although the initial impulse to accept a cognitive approach was felt in semantics, its influence has not been confined to this level. Lakoff (1982) cites applications of prototype theory to syntax and phonology. In 1983, Bybee and Moder published an article entitled "Morphological classes as natural categories" in Language. This spilling over of
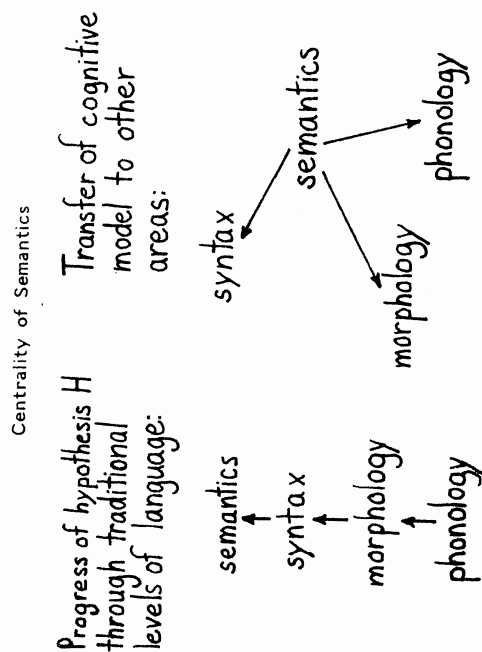
what was originally recognized as a theory applicable to semantics into other levels of linguistics is remarkable when we consider how ideas have been developed and spread from level to level in the past. The hierarchy of linguistic levels which is traditionally recognized is the logical outcome of a reductionist view of language (see Figure 5). Primitives, such as phonemes and distinctive features, are isolated and examined. Most research has, until recently, been conducted on phonology, which is considered to be closest to surface perception and therefore the basic level of language. Linguists have tried to apply hypotheses drawn on this level to successively "higher" levels, thus ascribing to each level a structure parallel to that of phonology. Distinctive feature theory is an excellent example of a hypothesis which was originally worked out at the phonological level and subsequently adapted to higher and higher levels. At the semantic level at least, analogies to hypotheses about phonology have met with considerable resistance. Individuals who have doggedly tried to carry out such analogies have produced systems, such as van Schooneveld's four-dimensional "cubes," which, rather than shedding light on semantics (many of his scattered insights do shed some light, but his system as a whole is wrapped in mystery) seem cryptical and contrived. Pre-structuralist semantic descriptions such as that of Boguslawski were primarily concerned with dissecting and cataloging and likewise did not present a satisfying and coherent theory of meaning. In both cases the semantic description appears to be a highly artificial exercise, not motivated by semantics itself. As we

have seen, the seed of dissatisfaction sown by such descriptions[11] has in some cases grown into the acceptance of an entirely different model of structure. The spread of this cognitive model is unprecedented in both its point of origin within linguistics and in its direction of spread. First, its appearance on linguistic soil was made in semantics rather than phonology. Second, the cognitive model has not spread sequentially through the levels of linguistics, but rather to all of them in no particular order. Relative to distinctive feature theory, which was carefully worked out at one level before it was applied to the next, the cognitive model has produced a small explosion in linguistics, in which the concepts behind natural categorization have found direct avenues to every level of language. In fact, at this point it is probably no longer accurate to speak of "levels"; perhaps "areas" would be more accurate. The very way in which these concepts have spread demonstrates that the notion of linguistic levels may not be valid, or at least that it is not the only valid structure which we can ascribe to language. Note that the differences between the two structures in Figure 5 correspond to differences between reductionist and cognitive logic: there is nothing in the cognitive model to suggest that any of these areas of language is more "primitive" than any other. It does appear, however, that semantics is central; this is consistent with Langacker's (1982)

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[11] Cf. Langacker 1982: "The primary need of linguistics today, as I see it, is a conceptual framework which makes language appear straightforward rather than mysterious, and which permits the unified description of the many facets of language structure that present theories insist on forcing into separate boxes."

observation that "meaning is what language is all about."

Figure 5: Levels of Language vs.

Centrality of Semantics

Progress of hypothesis H
through traditional
levels of language:

semantics ←
syntax ←
morphology ←
phonology

Transfer of cognitive
model to other
areas:

syntax
semantics → morphology → phonology

The very fact that the cognitive model thus tampers with our conception of the gross structure of language predicts that it will encounter widespread resistance among linguists. It can hope to gain general acceptance only through the patience and perseverance of its supporters.

The contents of this subsection are impressionistic and speculative. This does not mean, however, that they are inappropriate in any way. At this point in time it appears that we are witnessing the formative growth of an idea whose significance may well be enhanced with time. Speculation and extrapolation are therefore the only means

available for giving an overall picture of the impact of natural categories on linguistics.

3.3 SUMMARY

The first three chapters of this dissertation have examined the history of approaches to the semantics of Russian verbal prefixes and explored a possible alternative framework. It might have been easier to merely outline the underlying assumptions of the cognitive model of semantics and proceed directly with an analysis of the given prefixes according to that model. However, given the strictly classical history of semantic descriptions of Russian verbal prefixes together with the fact that the cognitive approach is not at this point generally accepted in linguistics and virtually unknown in Slavic linguistics,[12] I considered it necessary to fully explain the disadvantages of classical semantics as well as the history of a new approach which may remedy them. In so doing I have expanded the aims of this dissertation. My original goal was to achieve a semantically sound description of verbal prefixes. In the process I have of necessity undertaken a second goal: to contribute an argument in defense of linguistic analysis incorporating cognitive semantics. The natural symbiosis of these goals should reinforce both arguments. There are risks in using this model, not only because it represents largely unexplored territory, but also because it ultimately demands a restructuring of linguistics,

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12 To my knowledge, Rudzka-Ostyn is the only individual who has published work on a Slavic language (Polish) developed according to the cognitive model.

as mentioned in the preceding section. The benefits, however, as outlined below and illustrated in the following chapters, make these risks worth taking.

3.3.1 An outline of the modified structuralist approach

Although the classical and cognitive approaches have been discussed in various places above, it would be useful at this point to outline and compare their characteristics. The information given here is intentionally oversimplified in order to provide the reader with a schematic guideline for the detailed description which follows. Table 5[13] contrasts the basic assumptions of the two approaches.
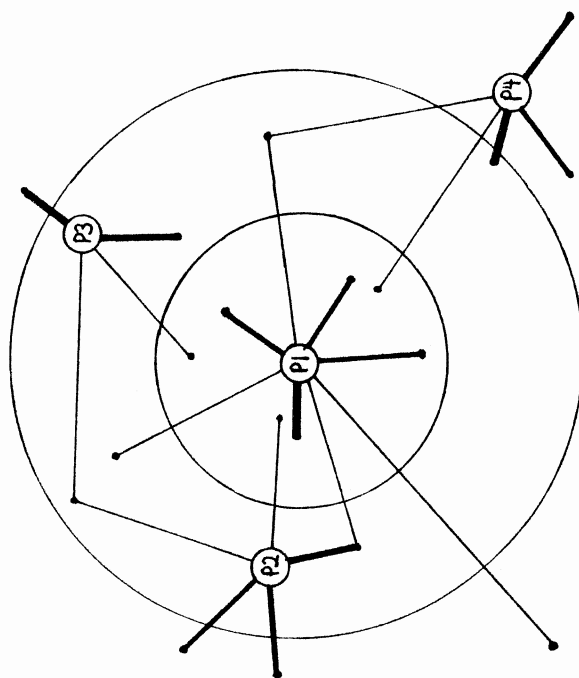
Table 5

	CLASSICAL SEMANTICS	COGNITIVE SEMANTICS
Meaning is defined by:	invariant properties	an ICM/prototype
Membership is recognized by:	presence of invariant	"family-style" rela- tionship to prototype
Membership is:	absolute	scalar
Members:	are all equal	have varying status

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[13] I am indebted to Lakoff (1982) for many of these neat, concise characterizations.

Two differences are striking: the absence, in the cognitive approach, of boundaries (concomitant with the presence of membership gradience) and the absence of an invariant. Chapter 2 isolated the insistence on definition by invariants as a major stumbling block to satisfactory semantic description. The impossibility of arriving at a satisfactory definition of the meaning of a lexical item by means of invariants was demonstrated with the example *chair*. Each suggested definition was found to be simultaneously both too narrow and too broad. In the framework of classical set theory categorization, this phenomenon appears highly paradoxical, but given the cognitive model, the situation is not a bit perplexing. It is in fact a logical consequence of the imposition of set theory on natural categories. Figure 6 is a diagram of a hypothetical group of categories. The prototype is identified with "P" and its members are joined to it by lines of varying thickness, indicating the directness of their relationship to the prototype, as well as their membership status. In this diagram space is metaphorically identified with the possession of various properties. The categories both interlock and overlap. In some cases a member of one category may be located near the prototype of another, but is not recognized as a member of that other category. To quote an oft-cited example, the Pope certainly fulfills the definition of *bachelor*, but it is doubtful whether anyone would consider him a member of that category. *Toy chair* is an example of overlap, since it is a member of both *toy* and *chair*.

prototype relevant to a given category and the relations which link the members to that prototype. In deposing invariance from its central role, the cognitive approach also does away with the problems posed by classical semantics (listed in 2.3.4). The following chapters will give an example of how the implementation of cognitive semantics can produce a description preferable to those based on set theory. As mentioned above, this approach will be termed modified structuralist since a) it continues the structuralists' efforts to correct traditional descriptions and b) like the structuralist model, modified structuralism depends on a limited set of constraints, although they are internal rather than external in the present system. A further discussion of why the term modified structuralism has been coined and how modified and standard structuralist approaches differ is contained in the section entitled "On linkage" (9.2).

Figure 6: Imposing set theory on natural categories

A pair of circles has been superimposed on this diagram, representing set theory attempts to capture the category whose prototype is P1 (by enclosing the space which represents invariant properties). Each circle excludes some of the members of the category and at the same time includes non-members. It is impossible to draw a circle that will encompass all and only the members of a given category.

The cognitive approach removes the need to identify invariant properties. Rather it requires that the linguist discover the