Group Effectiveness Research Laboratory

DEPARTMENT OF PSYCHOLOGY · UNIVERSITY OF ILLINOIS · URBANA, ILL.

INTERPERSONAL VERBS AND INTERPERSONAL BEHAVIOR

CHARLES E. OSGOOD
INSTITUTE OF COMMUNICATIONS RESEARCH
UNIVERSITY OF ILLINOIS

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FRED E. FIEDLER AND HARRY C. TRIANDIS
Principal Investigators

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Charles E. Osgood

Institute of Communications Research

University of Illinois

Abstract

This report provides a summary of the research to date on the semantics of interpersonal verbs and the applications of the information obtained to cross-cultural studies of interpersonal norms and behaviors. More detailed Technical Reports and publications of particular studies have been prepared or are in preparation.

A theory of interpersonal perception and behavior in relation to the meanings of interpersonal verbs in the language is presented. Intuitive and empirical approaches to the discovery of semantic features are contrasted. The potential powers and limitations of empirical methods are illustrated by a review of the semantic differential technique. The results of an intuitive, a priori analysis of the semantic features of some 200 interpersonal verbs are summarized (cf., Technical Report No. 39); the 10 semantic features derived from this analysis serve as one criterion for the success of empirical procedures being developed. A new empirical approach, called semantic interaction technique--essentially, using the rules of usage of words in syntactic combination as the basis for inferring the semantic features of the words thus combined--is described, along with a preliminary theory of the dynamics of semantic interaction. Two measurement models of semantic organization--the familiar factor analytic model (continuous) and a new semantic feature model (discrete)--are tested against empirical data on judgments of interpersonal--verb/adverb

combinations, with encouraging results. A variety of validation checks on the features derived--including a semantic word game, feature scaling, feature satiation and word-finding tests--are described. Finally, several cross-cultural, cross-linguistic studies are reported, including a comparison of Japanese with American English interpersonal-verb/adverb intersection results, a study of the features of Thai interpersonal pronouns, and a comparison of Japanese-in-Japan vs. Hawaiians-of-Japanese-ancestry vs. American-English-in-Illinois on a new form of Role Differential based upon the semantic studies of interpersonal verbs.

INTERPERSONAL VERBS AND INTERPERSONAL BEHAVIOR

Charles E. Osgood*

Institute of Communications Research
University of Illinois

This paper is my attempt to summarize and interpret some four years of research on the semantics of interpersonal verbs in relation to the norms of interpersonal behavior. Quite a number of colleagues and graduate students in our Center for Comparative Psycholinguistics have contributed to this research.[1] Some of their studies, and mine, have been published, some others will be in the near future, and some will never be published --

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[1]Contributors to particular studies will be cited in course, but I want to express special gratitude to Dr. Kenneth Forster, with whom I first explored some new directions in semantic feature analysis while on sabbatical in 1964-65 at the University of Hawaii, and to Dr. Marilyn Wilkins, with whom I have worked closely since returning to the University of Illinois. Both have served as intellectual goads and sophisticated critics throughout.

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because we were thoroughly dissatisfied with them. Nor are we at this point satisfied that we have solved the central problem -- specification of a theoretically principled and empirically rigorous procedure for discovering the semantic features of word forms. Nevertheless, in the patterning of failures and partial successes

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we are beginning to see some sense and some relationships to the approaches of others.

The schema of this paper will be as follows: After some introductory comments on relations between language, thought and behavior and a brief review of earlier work with the semantic differential technique, I will describe an approach to the measurement of meaning which employs the rules of usage of words in combination as a means of discovering the semantic features of the words thus combined. I believe that this approach, while designed to be empirical rather than intuitive, will be found to be not inconsistent with those of some contemporary linguists (e.g., Chomsky, 1965; Fillmore,1967). An a priori analysis of the features of interpersonal verbs, designed to serve as a rough guide for interpreting and evaluating subsequent research, will be followed by a variety of empirical studies on discovery procedures and validity studies on what was discovered. Then we will turn to the interpersonal behavior side of this coin, reporting studies with what has come to be called "a role differential" and studies of a cross-linguistic and cross-cultural design which enliven the possibility of universal semantic features. I will conclude with a few footnotes toward a semantic performance model and a critique of our own work to date.

Language, Thought and Behavior

Put in most general terms, I conceive of thought (meaning, significance-intention) as an intervening variable mediating between antecedent signs (perceptual or linguistic) and subsequent behaviors

(non-verbal or verbal). Interpersonal behavior is merely a special case, albeit a very interesting one, of this more general paradigm. The sequences of events may be completely non-verbal, as when PERSON A beckons to PERSON B (perceptual sign for B), and, when B fails to respond, we infer an interpersonal intention (thought) on the part of B which might be characterized as To Disregard.[2] The sequence may be entirely verbal, as, when on the telephone, PERSON A says "You ought to be ashamed of yourself" (linguistic signs), PERSON B replies "I'm sorry I did it" (linguistic responses), and we infer the intention of A To Criticize B and of B To Apologize To A. It might be noted in passing that the interpersonal verbs of English fail to make any obvious distinction between overt behaviors and the intentions behind them; whereas the sentence Sally beckons to John refers to interpersonal behavior, the sentence Sally helps John refers to an interpersonal intention -- SALLY may be expressing the intention To Help JOHN by handing him tools, by typing his term paper, and so on nearly ad infinitum. Indeed, the distinctions between verbs describing concrete actions (beckoning), classes of actions (typing) and intentions

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[2]Throughout this paper I shall try to adhere to the conventions of using all-caps for roles (e.g., FATHER to SON), italics for non-linguistic signs and behaviors (e.g., A beckons and B approaches), italics in quotes for linguistic signs and behaviors (e.g., A "you clumsy ox" to B "I'm terribly sorry"), and italics with caps for interpersonal significances or intentions (e.g., PERSON A To Help PERSON B).

(Helping) are very difficult to specify.

A Generalized Mediation Model

Figure 1 describes a generalized mediation model for interpersonal perception and behavior. I assume that mature and participating members of any language-culture community have developed an elaborate set of symbolic processes (r - - - - s)

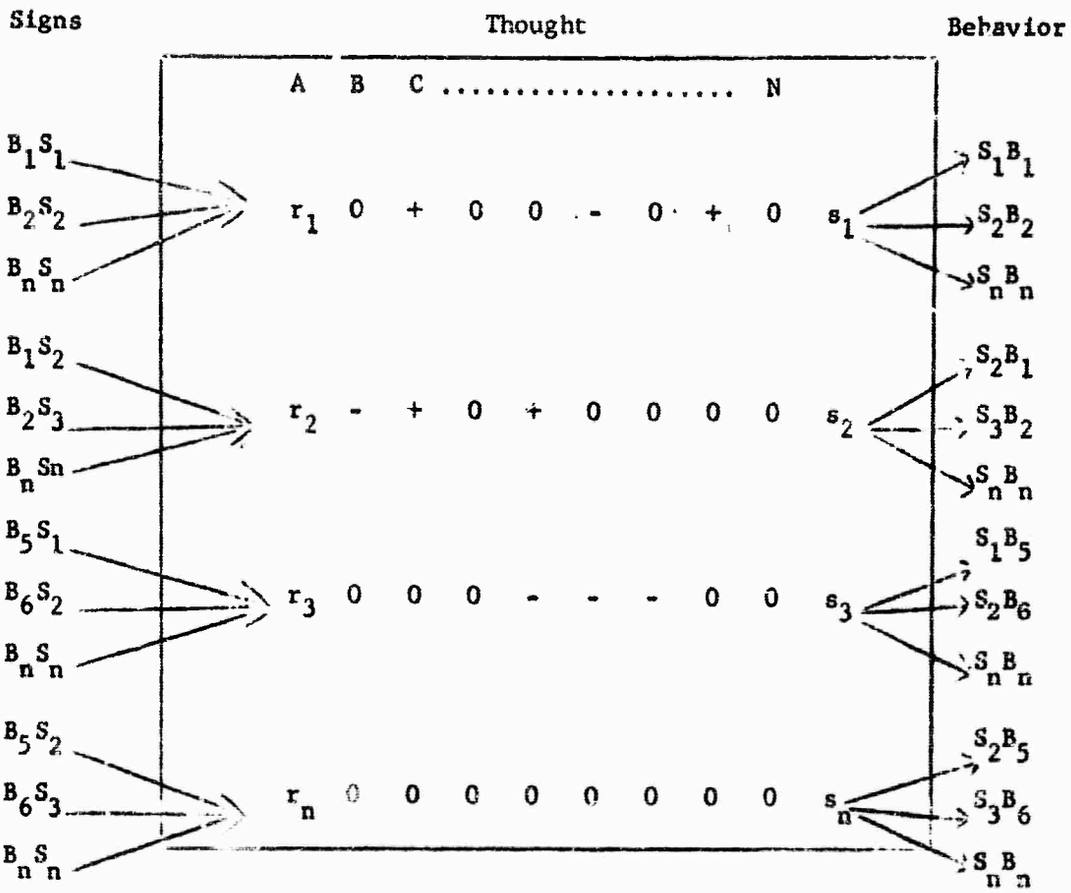
FIGURE 1 ABOUT HERE

for which the antecedents are the perceived interpersonal behaviors of others (B's) in certain situational contexts (S's) and for which the subsequents are interpersonal behaviors of the individual himself also dependent upon situational contexts. As dependent events, these symbolic process (thoughts) will be termed <u>significances</u> (i.e., interpretations of the behaviors of others); as antecedent events, the same symbolic processes (thoughts) will be termed <u>intentions</u> (i.e., motivations of behaviors toward others). It is apparent that the significance attributed by A to the perceived behavior of B is A's <u>inference</u> about the intention of B -- and, of course, it may be quite wrong, particularly in the interactions of people from different cultures.

Like other semantic processes or meanings, it is assumed that each significance/intention (r - - - - s) can be characterized as a simultaneous bundle of distinctive semantic features (A, B, C . . . N in the Figure). I conceive of these features behaviorally, as a simultaneous set of events in N reciprocally antagonistic reaction systems.[3] They may also be represented by a code-strip, as in

Figure 1

A Mediation Model of Interpersonal Behavior



[3]Although this behavioristic identification is not essential to much of the quantitative research to be described -- many other models could be used -- it is my conviction that since (a) language behavior must ultimately treated as part of behavior-in-general, (b) interpersonal behavior involves non-linguistic, perceptual as well as lingusitic signs (and purely linguistic constructs make no contact here), and (c) interpersonal norms can be established in the absence of language (e.g., in congenital deaf-mutes), maintaining linkage with behavioristic conceptions is fruitful. It also leads to some unique predictions.

Figure 1. For convenience in exposition, it is here assumed that codings on features are discrete, all-or-nothing; the probability of the matter is that continuous coding is the general case and discrete coding the special case.

A componential system of this sort is extraordinarily efficient: Although the number of distinctive features will (hopefully) be quite small, the number of significance-intention processes that can be generated from their combinations will be large. These mediational processes can render many diverse over behaviors functionally equivalent, both as significances and as intentions (as suggested by the convergent and divergent arrows in Figure 1). Add the notion of modiated generalization (or rule, if you prefer), and a potentially infinite set of interpersonal perceptions and behaviors can be identified with a limited set of mediation processes which, in turn,

can be differentiated in terms of a relatively very small set of semantic componential features.

Language as a Mirror of Thought

As has already been implied, I make the further assumption that in any language the words used to talk about interpersonal behaviors will be coded on the same semantic features as the perceived behaviors themselves. Thus, the interpersonal verb To Console as a linguistic sign will evoke in a listener a pattern of semantic features similar to that which the perceptual sign in the observer produces (e.g., seeing a mother stroking the face of a frightened child). This assumption -- if justified -- provides an entre to the structure of interpersonal behavior in a culture. Appropriate analysis of the semantics of interpersonal verbs may illuminate the rules which govern the norms of interpersonal behavior in that culture.

This does not assume that language is a perfect mirror of thought that it maps all of the subtleties of interpersonal behavior. Not only are there many intentions for which a language fails to provide adequate expression -- translation difficulties across even closely related languages like English and French testify to this -- but the semantic codings of words must inevitably constitute a reduction, an abstraction, from the potential codings of things-as-perceived. The sight of a mother stroking the face of a frightened child is at once more unique and more rich in meaning than the hearing of the word console. Words sacrifice semantic richness to achieve generality of usage. However, a perfect mapping is not essential for present purposes. If the meanings of words and the meanings of things-as-perceived share the same semantic

features, and if the mapping of the one into the other is at least roughly co-extensive, then it should be possible to use the rules governing the one as an indicator of the rules governing the other.

Cross-cultural Comparison

In order to make comparisons across languages and cultures in any domain, it is necessary that they have something in common. If the items of subjective culture -- values, attitudes, meanings, and norms of interpersonal behavior -- were in truth completely unique, they would be completely incomparable. The reduction of the complexities of interpersonal behaviors to sets of mediating intentions, and these in turn to a limited set of componential semantic features, enlivens the possibility of discovering universals -- without, of course, guaranteeing it.

What might we expect to be shared across human groups in the domain of interpersonal relations? Certainly not the overt expressions of intentions. Certainly not the appropriateness of particular intentions for particular role-pairs -- the intent To Obey may be quite appropriate for a mature son toward his father in one place but quite inappropriate in another. Probably not the exact set of intentions themselves -- as culturally defined roles vary, so may the types of intentions. The most likely constant in this domain would seem to be the dimensional feature structure of the intentions themselves. Thus we might expect all human groups to distinguish between Associative and Dissociative intentions (Helping vs. Hindering), between Supraordinate and Subordinate intentions (Dominating vs. Submitting), and so forth -- simply because

they are human. If such a common feature system could be demonstrated, then comparisons across groups could be made in a reasonably rigourous way.

If A and B are members of different cultures, we might (in theory) expect them to use the same distinguishing features, to vary somewhat in the set of intentions they employ, to differ considerably in codings and weights given to translation-equivalent intentions, to differ considerably in the exact overt behaviors by which they express these translation-equivalent intentions, and to differ markedly in the rules governing the appropriateness of having and expressing certain intentions in certain role relations. Assume that AMERICAN BUSINESS MAN slaps on the back JAPANESE BUSINESS MAN when meeting by surprise on a street corner in Tokyo. If the nearest equivalent of the intent To Express Friendship in the Japanese system includes a negative coding on the Supraordinate-Subordinate feature, the Japanese may correctly interpret the American's behavior, yet respond in a deferential manner that surprises the American. Or, if the intent To Express Friendship is inappropriate between businessmen role-pairs, the Japanese may correctly interpret but privately think the American a fool. Or, if slapping on the back between adult males signifies the intent To Insult, our Japanese friend is most likely to turn away abruptly -- and the American concludes that Japanese are unfriendly! Needless to say, this illustration is profoundly hypothetical.

In order for a person to assimilate the norms of another culture, he presumably must experience a sample of interpersonal

behaviors in that culture, involving various roles and overt expressions, and gradually establish a set of inferences about the significance-intention mediators that are operating. The test of his assimilation is the success with which he can project this "knowledge" into novel interpersonal situations. The term "knowledge" is used here in much the same sense that one may be said to "know" the rules of his grammar -- following the rules without necessarily being able to verbalize them. There is probably more than an analogy between "knowing" the rules of a grammar and "knowing" the norms of a system of interpersonal behavior. In both cases, a sure intuitive feel is a better guarantee of fluency than being able to verbalize the abstract rules. And in both cases, induction of the semantic features operating and their "deep structure" is essential if one is to make successful projections to new instances.

The Problem of Characterizing Meaning

There appears to be pretty general agreement these days among psycholinguists, regardless of their disciplinary origins, that meanings can be characterized as "simultaneous bundles of distinctive semantic features," in much the same way that Jakobson and Halle ( ) and others after them have characterized phonemes as simultaneous bundles of distinctive phonetic features. There is disagreement about whether all, most or only some of the features known to be operating are properly to be called "semantic" rather than "syntactic," but this issue will not concern us at the moment. The efficiency with which a relatively small number of features can generate an extra-

ordinarily large number of distinctive meanings makes such a componential system very appealing. The problem, of course, is to devise a principled basis for discovering these features. An ideal discovery procedure would meet the usual scientific criteria of objectivity (comparability of features discovered across observers), reliablility (yielding the same features in repeated, independent observations), validity (yielding features that correspond to those discovered by other methods) and generality (applicability of the procedures to the discovery of features of all types). This is a large order, and no ideal discovery procedure may be attainable.

Alternative Discovery Procedures

It is possible to distinguish two grossly different discovery procedures at the outset, and these do reflect the disciplinary backgrounds of those who use them. Intuitive methods. Here the investigator utilizes his intimate knowledge of (usually) his own language as a native speaker. Semantic features are discovered by the same strategies of subsitution and contrast that have proven so successful at the phonemic level. The criteria of objectivity, reliability, validity are sought, typically, by the use of compelling demonstrations that appeal to the intuitions of other (scholarly) native speakers -- e.g., that in the sentence John is eager to please John is obviously coded for subject whereas in the superficially similar sentence John is easy to please John is obviously coded for object (appropriately chosen paraphrases reinforce the appeal). Generality of application is no problem. Empirical methods. Here the investigator may also employ his own intuition as a native speaker (indeed, he should),

but they are used in devising appropriate linguistic measures to be applied to other native speakers and for interpreting the results. Here the strategies of substitution and contrast take the form of quantitative similarities and differences within the judgments about, or usages of, selected language items by these other native speakers. Objectivity (across investigators) and reliability (across repetitions) are tested statistically; validity is sought by checking features against those obtained by other methods (where available) or against the linguistic intuitions of other investigators. But here generality becomes a significant problem: a method that works for certain types of features or for certain form classes may not work for others.

Intuitive or rational methods are typically used by linguists, semanticists, lexicographers and philosophers; it is part of their tradition. Empirical methods are typically used by psychologists; it is part of their tradition. Intuitive methods have the advantages of obvious generality and full utilization of the competence of sophisticated native speakers; they have certain disadvantages -- what may be compelling demonstrations to one native speaker may not appeal at all to another, as the many delightful bickerings at linguistic symposia testify, and what may be easy to intuit in one's own language may be difficult if not impossible to intuit in a foreign language, particularly an "exotic" one. Empirical methods have the advantages of scientific objectivity and quantification, as well as the potential for application to languages of which the investigator is not a native speaker; they also have certain dis-

advantages -- beyond the problem of generality, there are questions about the fruitfulness of using ordinary native speakers, about the appropriateness of statistical determinations in an area like this, and about the sensitivity of such procedures in discovering the subtle distinctions made in semantics.

Semantic Differential Technique: Its Successes and Limitations

The semantic differential technique is one empirical approach to the measurement of meaning, and it will illustrate nicely both the potential powers and potential limitations of empirical approaches generally. This particular discovery procedure, on which we started working almost twenty years ago at Illinois, takes off from the theoretical notion that the meaning of any concept can be represented as a point in an n-dimensional space. The origin of this space is defined as "meaninglessness," and the vector from the origin to any concept-point represents by its length the degree of "meaningfulness" and by its direction the "quality of meaning" of the concept. The dimensions of this space, represented geometrically by straight lines through its origin, are defined by polar qualifiers (adjectives in English), and it is the clusterings among these qualifiers, as determined from the similarities of their usage in rating substantives (nouns in English), that characterize the underlying semantic structure.

There are several things to be noted about this model: First, it lends itself readily to the powerful mathematical procedures of multivariate statistics, including factor analysis (feature discovery) and distance analysis (similarity and difference in meaning). Second,

it is a componential model and gains all the efficiency of such models -- but unlike those familiar to linguists, its features (factors) are continuous rather than discrete in coding and are linear rather than hierarchical in organization. Third, the data which fit the model and are analysed by multivariate procedures can be viewed as a sampling of linguistic frames -- a "corpus" if you will -- but a highly selective rather than a random sample.

This third point requires a bit of elucidation. When a sample of subjects (native speakers) rates a sample of concepts (substantives) against a sample of bi-polar scales (qualifiers and quantifiers). a three-dimensional cube of data in generated. Each cell in this cube represents the discriminative usage of a particular substantive with respect to a particular mode of qualification by a particular speaker. In the usual format, every concept is rated against every scale, with each item appearing as, e.g.

TORNADOS

fair____(+3):____(+2):____(+1):____(0):____(-1):____(-2):X(-3) unfair

and with the subject instructed to check the appropriate position. The spaces in both directions from the center are defined by the adverbial quantifiers, "slightly," "quite," and "extremely" -- quantifiers which happen in English to yield approximately equal increments in intensity. Each item as checked may be viewed as a standardized type of sentence in the corpus -- in the present case, the sentence Tornados are extremely unfair.[4] Other sentences in the

[4] Of course, it can be legitimately argued that it is semantically anomalous to speak of tornados as being either fair or unfair, but this is precisely the nub of the issue, as will become apparent.

speakers corpus might be My mother is slightly cold, Sponges are neither honest nor dishonest, Defeat is quite ugly, and so forth. The representativeness of the corpus -- within the limitations of this standard "syntactic" frame -- depends upon the adequacy with which both concepts (sentence subjects) and scales (sentence predicates) are sampled.

Working first with various groups of American English speakers and more recently with native speakers in some twenty language-culture communities around the world,[5] both indigenous factor analyses (interpretable by translation of scales loading high on factors) and what we call pan-cultural factor analyses

[5] Space does not permit any detailing of the procedures followed in our cross-cultural studies. Interested readers are referred to Osgood, C. E., Semantic Differential Technique in the Comparative Study of Cultures, Amer. Anthr., 66, 3, 1964.

(interpretable directly, mathematically, in terms of scales having similar discriminating functions across 100 translation-equivalent concepts) have regularly yielded the same three dominant factors or features. The first is a generalized Evaluation Factor (defined by scales translating like good-bad, kind-cruel, pleasant-unpleasant);

the second is a generalized Potency Factor (defined by scales like strong-weak, hard-soft, big-little); and the third is a generalized Activity Factor (defined by scales like active-passive, quick-slow, excitable-calm). From this point on I shall refer to this as the E-P-A system. Factors beyond these three are nearly always small in magnitude and usually defy interpretation. If we consider the various analyses of American English data and the twenty or so analyses involving other languages and cultures to be replications in the experimental test of an hypothesis, then we can certainly conclude that E-P-A is a reliable and valid characterization of at least part of the human semantic system -- a universal set of features, if you will.[6]

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[6] Of course, there will be some who will argue E-P-A are not semantic features at all, but have something to do with emotional reactions. But then they must explain the significant role of the E-P-A system in strictly linguistic behaviors. I will return to this question.

But it will also be evident to the reader, as it was to us early on in the game, that the semantic differential technique, as usually employed, does not have generality as a discovery procedure. The three features identified as E, P and A -- universal and significant in human behavior though they may be -- obviously do not provide a sufficient characterization of meaning. Not only are these features quite unlike those discovered by intuitive methods (e.g., Abstract/

Concrete, Animate/Inanimate, Human/Non-human, and the like), but it can be readily demonstrated that word forms having near-identical E-P-A codings rarely meet the substitution criterion of synonymity. NURSE/SINCERE and HERO/SUCCESS are two such pairs: I can say She's a cute nurse, but not she's a cute sincere; I can say Our hero defied them, but I can't say Our success defied them. I once carried around a little notebook and jotted down my own "aphasic" slips; they were all denotative in nature, quite unrelated to the E-P-A system -- like saying bring me the pliers when I intended bring me the nail-clippers and saying where is the mushroom (usually served in my hot chocolate) when I intended where is the marshmallow.

I think the answer to "why" the E-P-A system of features is so universal and so obviously affective in nature is simultaneously the answer to "why" the semantic differential technique, as usually employed, is insufficient as a discovery procedure. These features only appear dominantly and clearly when a large and diversified set of concepts is rated against a large and diversified set of scales. Let us ask ourselves what must happen to particular scales in this situation, for example, hot-cold and hard-soft: For only a few concepts in our typical set of 100 will hot-cold be denotatively relevant (e.g., FIRE, STONE, HAND, RIVER) or hard-soft be denotatively relevant (e.g., STONE, BREAD, TOOTH, CHAIR); for all other concepts, since we require every concept to be rated on every scale, hot-cold and hard-soft must be used metaphorically (e.g., for concepts like DEFEAT, ANGER, POWER, MOTHER, MUSIC, CRIME and PEACE). Perhaps the most important general principle of human language behavior we have found in our work is that affective meaning is the common coin of metaphor. When substantives and qualifiers that are literally

anomalous are forced into syntactic confrontation -- as in hard power vs. soft power or hot defeat vs. cold defeat -- it is the common affective features (E-P-A) which determine the semantic resolution. In effect, each scale tends to rotate in the semantic space toward that basic affective factor on which it has some loading -- hot-cold toward A (Active-Passive), hard-soft toward P (Potent-Impotent), sweet-sour toward E (Good-Bad), and so forth. And since, in multivariate analysis, the factors run through the regions of highest density (correlations among scales), massive E, P and A features appear and other semantic features are obscured.

Partialing Out E, P and A

In what has just been said, you may have noted that I repeatedly used the phrase "as usually employed" in speaking of the insufficiency of the semantic differential technique. Is there any way in which the influence of these dominant affective features can be eliminated, or at least reduced, in this discovery procedure? One cannot merely eliminate the purest E-P-A scales and then re-factor the remainder -- these features were in the heads of our subjects and influenced all of their judgments. Only very recently, and via an insight on the part of Jorma Kuusinen,[7] have we found

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7 Kuusinen is a visiting professor from Finland at our Center for Comparative Psycholinguistics this year. Just how it is that the rest of us never had this idea is quite beyond me, but that's the way it goes.

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a promising way to at least minimize the influence of E-P-A and allow other, more subtle, features to emerge. The procedure is, quite simply, to determine the partial correlations of all scales with the purest representatives of E-P-A, eliminate the influence of E-P-A upon all intercorrelations statistically, and then re-factor the residual matrix. What this does, in effect, is to minimize the influence that E, P and A features of meaning presumably had in determining subjects' judgments of all concept-scale items -- accomplishing statistically what some mysterious surgery might accomplish by way of making subjects affectively aphasic!

Kuusinen was working in the personality area. He had found that when a total of some 60 scales -- many relevant to personality concepts and some drawn from our standard Finnish semantic differential results -- were factored, the familiar E-P-A system came through loud and clear, but little else. Table 1 gives the highest

TABLE 1 ABOUT HERE

loading scales for the first four factors in this analysis. Note that the first, clearly E, factor accounts for 52% of the total variance. Factor two is a version of A and factor four is a version of P, while factor three does look like a new feature for personality concepts. When the partialing and re-factoring process is applied, a very different and, I think, very exciting picture emerges, as shown in Table 2. Six readily interpretable

TABLE 2 ABOUT HERE

"personality" factors appear, and the variance is spread much more evenly among them. We have a Trustworthiness Factor (19%), what might be called a Self-right eousness Factor (19%), a Rationality

TABLE 1

Finnish Personality Differential:

Varimax-Rotation of Six Factors, Whole Data

Factor I (52.2%)		Factor II (11.5%)	
moral-immoral	-.98	fast-slow	-.91
reputable-disreputable	-.97	agile-clumsy	-.89
obedient-disobedient	-.96	courageous-timid	-.67
trustworthy-untrustworthy	-.95	inventive-uninventive	-.67
predictable-unpredictable	-.94	attentive-inattentive	-.65
good-bad	-.93	individualistic-regular	-.63
diligent-lazy	-.93		
tangible-intangible	-.93		
honest-dishonest	-.93		
necessary-unnecessary	-.92		
clean-dirty	-.92		
rational-irrational	-.92		
faithful-unfaithful	-.90		

Factor III (10.9%)		Factor IV (8.5%)	
broadminded-narrowminded	.90	sturdy-delicate	-.95
relaxed-tense	.71	large-small	-.92
sense of humor-no sense of humor	.67	heavy-light	-.86
individualistic-regular	.65	strong-weak	-.67
tolerant-intolerant	.63		

TABLE 2

Finnish Personality Differential

Varimax-Rotation of Six Factors, Partialed Data

Factor I (19.3%)	
trustworthy-untrustworthy	-.96
honest-dishonest	-.93
faithful-unfaithful	-.83
straight-crooked	-.78
reputable-disreputable	-.76
clean-dirty	-.70
Factor III (15.6%)	
logical-intuitive	.89
rational-irrational	.83
knowing-unknowing	.82
attentive-inattentive	.75
wise-stupid	.69
inventive-uninventive	.67
careful-careless	.66
Factor V (11.7%)	
sense of humor-no sense of humor	.85
sad-glad	.73
broadminded-narrowminded	.72
tolerant-intolerant	.66
relaxed-tense	.60
Factor II (18.7%)	
selfish-unselfish	.90
wholesome-unwholesome	.87
impatient-patient	.78
proud-humble	.77
tough-tender	.76
excitable-calm	.74
self-confident-insecure	.67
Factor IV (11.9%)	
usual-unusual	.88
predictable-unpredictable	.79
poor-rich	.69
regular-individualistic	.67
obedient-disobedient	.67
Factor VI (8.3%)	
sociable-solitary	.84
beautiful-angry	.81
gregarious-self-contained	.63
polite-impolite	.58

Factor (16%), a Predictability Factor (12%), a Tolerance Factor (12%), and a Sociability Factor (8%). I believe the reader will agree that these factors label themselves quite nicely.

Encouraged by these results, we applied the same procedure to the American English data collected in connection with our cross-cultural project (100 concepts judged on 50 scales). The original factor system, with E-P-A left in, was typical and need not be presented. Table 3 gives the results of the partialed analysis.

TABLE 3 ABOUT HERE

Again we note the more even distribution of variance accounted for, and, for the most part, the factors are readily interpretable. Factor I appears to be an Aesthetic Factor, II a kind of Rationality Factor, III a kind of Visual Brightness Factor (its positive side reads like the polished surface of a new car!), IV clearly a Thermal-Dermal Factor, V clearly a Utility Factor, and VI perhaps what might be called a Have/Have-not Factor (with faithfulness being attributed to the Have-nots). Although the partialing technique yields a richer feature system -- as many as nine factors when E, P and A are included it still is not a sufficiently general procedure for discovering semantic features. The features we obtain are quite unlike those which lexicographers use on an intuitive basis and those which they do use regularly fail to appear.

An A Priori Semantic Analysis of Interpersonal Verbs

It appears that some judicial combination of intuitive and empirical methods is in order. An a priori, rational analysis of the semantics of interpersonal verbs could serve several functions.

TABLE 3

Varimax Rotation of American English Data (100 Concepts X 50 Scales)

With E, P and A Influences Partialed Out

Factor I (16.3%)		Factor II (16.3%)		Factor III (12.9%)	
soft-hard	.67	smart-dumb	.79	shiny-dull	.66
soft-loud	.64	straight-crooked	.75	light-dark	.63
tender-tough	.58	honest-dishonest	.71	sharp-dull	.63
smooth-rough	.56	sane-mad	.68	white-black	.62
beautiful-ugly	.56	true-false	.62	tough-tender	.60

Factor IV (10.8%)		Factor V (9.0%)		Factor VI (7.8%)	
hot-cold	.90	useful-useless	.82	rich-poor	.79
burning-freezing	.90	helpful-unhelpful	.75	full-empty	.48
dry-wet	.60	needed-unneeded	.72	unfaithful-faithful	.46

First, it could provide a kind of short-cut into the major features which differentiate words in this domain. Second, an intuitively satisfying set of a priori features could serve as a criterion against which to evaluate the validity of empirical discovery procedures. I decided to work with interpersonal verbs drawn from categories in Roget's Thesaurus, using myself as the sole informant -- a reasonably sophisticated native speaker as well as native "behaver." A large number of interpersonal verbs would be coded on a small number of intuited features, to determine how small a set of features could satisfactorily differentiate all of the verbs.[8] I assume that in many respects the approach I took here is similar in principle

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[8] The reader may be wondering just why interpersonal verbs have been the focus of our attention rather than some other word category. It is because, beginning in 1963, the author became involved in a project titled "Communication, Cooperation, and Negotiation in Culturally Heterogeneous Groups" (F. E. Fiedler, L. M. Stolurow, and H. C. Triandis, Principal Investigators), and the research reported here was supported in part by the Advanced Research Projects Agency, ARPA Order No. 454, under Office of Naval Research Contract NR 177-472, Nonr 1834 (36). The combination of purely psycholinguistic and cross-cultural interests seemed a natural one.

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to that employed by lexicographers, particularly the use of minimal contrasts in meaning as a discovery procedure. It differs, probably, in the source of intuitions about features (behavioral science

background), in the systematic comparisons within a semantic area (interpersonal verbs), and in its validation procedures (statistical contingency and distribution considerations).

Procedures

On the basis of discussions with Harry Triandis and Evelyn Katz about the development of a "Behavioral Differential,"[9] six a priori features were selected which it was thought differentiated significantly among interpersonal intentions and hence, be inference, should differentiate semantically among interpersonal verbs: Feature A: Associative/Dissociatve (To Help/To Hinder, To Guide/To Corrupt); Feature B: Initiating/Reacting (To Cheer Up/To Congratulate, To Persuade/To Disuade); Feature C: Directive/Non-directive (To Guide/To Set Free, To Command/To Disregard); Feature D: Tension-increasing Tension-decrea ing (To Stimulate/To Placate, To Irritate/To Calm); Feature E: Ego-oriented/Alter-oriented (To Confide In/To Cheer Up, To Exploit/To Corrupt); and Feature F: Supraordinate/Subordinate (To Lead/To Follow, To Indulge/To Appease). These contrastive intentions were defined as carefully as possible to facilitate the coding process.[10] Search of all Thesaurus categories for verbs

[9] Dr. Katz was developing a system for coding interpersonal behaviors in the content analysis of short stories (Katz, 1964).

[10] Details of these procedures may be found in a paper titled "Speculation on the Structure of Interpersonal Verbs," in press.

expressing interpersonal intentitons -- that is, acceptable in appropriate PN_1_____PN_2 sentences (HE Courted HER) and referring to abstracted intentions rather than concrete behaviors (To Punish but not to strike with a whip) -- and selection of only the most familiar in each category yielded a sample of 210 verbs.

Each verb was coded on each feature according to the following system. plus (+), intention includes the feature in its positive aspect and not its negative; minus (-), the intention includes the feature in its negative aspect and not its positive; zero (0), the intention is not distinguished by the feature (neither positive or negative on it or capable of being either). Each interpersonal verb was first coded globally on the six features; then the codings of all verbs on each feature separately were checked and final adjustments made for consistency in application.

Validity Tests for Six A Priori Features

Several questions of intuitive validity were put to this initial a priori analysis. (1) Are the clusters of words having identical feature code-strips closely synonymous in meaning? All such sets of verbs were tabularized and inspected; in some cases they did seem practically synonymous (e.g., +A -B -C -D -E +F, Forgive, Pardon, Excuse) but in others they were clearly not synonymous (e.g., -A -B +C +D -E +F, Punish, Condemn, Ridicule). Non-synonymous clusters imply either faulty coding or insufficient feature. (2) Are words with opposed coding on only one feature and identical on all others minimally contrastive and on the appropriate feature? All verb pairs with codings satisfying this condition were tabularized

and evaluated. In many cases the sense of minimal contrast was compelling (e.g., Inspire vs. Shame on Associative/Dissociative, Impress vs. Inform on Ego-oriented/Alter-oriented, Indulge vs. Appease on Supraordinate/Subordinate) but in many others it was lacking (e.g., Court vs. Retard on Associative/Dissociative, Confuse vs. Shame on Ego-oriented/Alter-oriented, and Tolerate vs. Follow on Supra-ordinate/Subordinate). Again assuming perfect coding, failures on this test imply that there are additional features than the one in question on which the verbs are also differentiated.[11] (3) Are the features reasonably independent of each other in coding across the verb sample and do they distribute the verbs reasonably among plus, zero and minus categories? Contingency tables of codings for each feature against every other feature were prepared and tested for significance. Table 4 presents only two of these tables for illustrative purposes, A/D and E/F. In the A/D table (Associative

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[11] It may be worth noting in passing that verbs diametrically opposed on all non-zero features do not have the feel of natural "opposites" (e.g., Guide vs. Evade, Flatter vs. Repudiate, Serve vs. Molest), although they do give one the impression of complete reciprocality; the familiar opposit es in my sample (e.g., Defend/Attack, Reward/Punish, Lead/Follow) characteristically display both some shared features and some opposed features -- Reward and Punish, for example, share Reactiveness, Alter-orientation and Supraordinateness, while opposing on Associativeness and Tension-production.

TABLE 4 ABOUT HERE

and Tension) note first the high negative correlation, corresponding to a Chi Square significant at the .001 level, with Associative behaviors being Tension-reducing and Dissociative behaviors being Tension-increasing; note second that, while Associativeness distribute the verbs reasonably well among plus, zero and minus categories, Tension codings have a very high proportion of zeros. For the E/F table (Ego- vs. Alter-orientation and Supra- vs. Subordinateness), on the other hand, there is reasonable independence between the the features, although both tend to be somewhat biased in distribution more Alter-oriented than Ego-oriented and more Supraordinate than Subordinate interpersonal verbs -- which may, of course, faithfully reflect human relationships.

Modification of A Priori Feature System

On the basis of the total evidence -- difficulty in coding, failure to yield many minimal contrasts, redundancy with other features, and extreme biases in distributions -- it was decided to eliminate original features C (Directive/Non-directive) and D (Tension-increasing/Tension-decreasing). Using the remaining four features, of course, verb categories collapsed together and the sets of quasi-synonyms became larger. These sets were searched for additional features which would do a maximum amount of work: a Terminal/Interminal feature was suggested by contrasts within sets like Unite With/Associate With, Inform/Supervise; a Future-oriented/Past-oriented feature was suggested within sets like Promise/Apologize, Compete With/Profit From, Frustrate/Disappoint; and a Deliberate/Impulsive feature was suggested by contrasts like

TABLE 4

Illustrative Contingency Tables for Features A/D and E/F

Tension-increasing/Tension-decreasing (D)

		+	0	—	
	+	1	37	32	70
sociative/					
	0	11	40	3	54
ssociative(A)					
	—	33	53	0	86
= .52 .001					
		45	130	35	210

Supraordinate/Subordinate (F)

		+	0	—	
	+	19	17	10	46
go-oriented/					
	0	26	31	8	65
ter-oriented(E)					
	—	54	33	12	99
= .17, n.s.					
		99	81	30	210

Guide/Inspire and Congratulate/Praise. Finally, the three affective features (E, P, A) found so regularly in our cross-cultural work were included -- not because they do so much "work" in this domain as in others (e.g., Emotion Nouns), but because they seem to be part of the total semantic picture.

With all interpersonal verbs coded on all ten final features, as illustrated in Table 5 with a small sub-set, the same tests of intuitive validity were applied as previously applied to the original six. The few clusters of verbs which remain with identical features

TABLE 5 ABOUT HERE

do seem closely synonymous (e.g., Soothe and Comfort; Concede and Acquiesce; Stimulate and Arouse; Confuse and Mystify; Shame, Embarrass, and Humiliate). The distinctions made between otherwise very similar interpersonal verbs are also intuitively satisfying: Greet is distinguished from Charm by being more Terminal but less Future-oriented; Pay Homage To differs from Show Respect For by being both more Potent and more Terminal; Forgive is distinguished from both Pardon and Excuse by its more Moral tone; Command differs from Lead

Table 5

A Priori Coding of Selected Interpersonal Verbs on 10 Features

	A Moral / Immoral	B Potent / Impotent	C Active / Passive	D Asscciative / Dissociative	E Initiating / Reacting	F Ego- / Alter	G Supra / Sub	H Terminal / Interminal	I Future / Past	J Deliberate / Impulsive
to greet	0	0	0	+	+	0	0	+	0	0
to charm	0	0	0	+	+	0	0	0	+	0
to show respect for	0	0	-	+	0	-	-	0	-	-
to pay homage to	0	+	0	+	0	-	-	+	-	-
to forgive	+	0	0	+	-	-	+	+	-	+
to pardon	0	0	0	+	-	-	+	+	-	+
to excuse	0	-	0	+	-	-	+	+	-	+
to soothe	+	0	0	+	-	-	0	0	0	-
to comfort	+	0	0	+	-	-	0	0	0	-
to concede to	0	-	-	+	-	-	-	+	-	+
to acquiesce	0	-	-	+	-	-	-	+	-	+
to command	0	+	+	0	+	0	+	+	0	+
to lead	0	+	+	0	+	0	+	0	0	0
to advise	0	0	0	0	+	-	+	+	+	+
to convert	0	0	0	0	+	-	+	+	+	0
to stimulate	0	0	+	0	+	-	+	+	0	-
to arouse	0	0	+	0	+	-	+	+	0	-
to confuse	0	0	0	0	0	-	+	0	0	0
to mystify	0	0	0	0	0	-	+	0	0	0
to shame	0	0	0	-	+	-	+	+	-	-
to embarrass	0	0	0	-	+	-	+	+	-	-
to humiliate	0	0	0	-	+	-	+	+	-	-

only by its more Terminal character; and Advise is distinguished from Convert only by its more Deliberate (or cognitive) character. In the contingency analyses, only one of the three added "denotative" features shows significant relations with others -- feature I (Future/Past) is somewhat correlated positively with E (Initiating/Reacting and negatively with H (Terminal/Interminal), which are not unreasonable relations. The E-P-A affective factors (here, features A, B and C) seem to operate on a different level; their contingencies with other types of features (Moral/Immoral with Associative/Dissociative, Potency with Supraordinateness, and Activity with Initiating) suggest that they typically serve to add an affective "feeling tone" to verbs already differentiated on other features.

This was an intuitively satisfying conclusion, and one might be content to let the matter rest here. The same systematic use of linguistic intuition could be applied in any semantic domain -- human role-nouns, emotion nouns, personality adjectives, and so on. But, for one thing, this is a soft methodology; the coding of words on a priori features is a rather slippery business, and, as many animated discussions with my colleagues revealed, codings can shift when words are placed in different frames (i.e., given different senses). We were aiming for a more powerful and objective methodology, one that could employ ordinary native speakers who had no semantic axe to grind. For another thing, the semantic features intuited for one domain (here, interpersonal verbs) might prove to be unique to that domain and not readily relatable to features intuited in another (role-nouns or verb-modifying adverbs, for example).

Just as the E-P-A system can be demonstrated in all lexical form classes (nouns, verbs, adjectives, adverbs), so it might be expected that more denotative features would also have generalized linguistic functions.

From Rules to Features

In 1964-65, with a sabbatical in Hawaii, time to do some much needed reading, and a young colleague, Kenneth Forster, to debate with more or less continuously, a quite different approach to the discovery of semantic features began to take form. The general notion that motivated our thinking was that the rules which govern usage of words in sentences and phrases are themselves based upon semantic distinctions.[12] This meant, in the first place, that we

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[12]Although this notion was not new (cf., Jakobson's paper in memory of Franz Boaz,1959), and is more familiar today after the publication of Chomsky's Aspects of a Theory of Syntax (1965), in which he indicates that "selectional rules" may well belong in the lexicon, it was a rather novel notion to us in 1964.

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should study the meanings of words in combination rather than in isolation. This also implied a return to the linguistic notion that similarity of meaning varies with the extent to which speakers use forms in the same or different contexts or frames (e.g., Harris,). If acceptability of utterances depends on both grammatical and semantic congruence among their parts -- and if purely grammatical congruences are assured -- then differences in acceptability should

become direct functions of semantic congruences. But what syntactical frames are appropriate, and can the task be adapted to ordinary speakers?

An Assist from Gilbert Ryle

In reading and discussing some of Ryle's papers on philosophy and ordinary language, we came across the following illustration: He claimed that one could not say significantly in ordinary English He hit the target unsuccessfully. Why? Although he does not put it exactly this way, it is because the verb phrase hit the target is coded for what might be called "goal achievement" whereas the modifying adverb is explicitly coded for "goal non-achievement"; therefore the sentence is, in Ryle's terms, "absurd." It occurred to us that, rather than merely using such examples as compelling arguments in philosphical debate, one might systematically explore the compatabilities of verb/adverb phrases as a discovery procedure in experimental semantics. In other words, our purposes were quite different than those of philosophers identified with the Oxford School.

There was also a difference in stress: Whereas the Oxford philosophers repeatedly emphasize that sentences have meanings and words only uses -- the analogy of words with the moves of pieces in a chess game is offered -- it seemed to us that there were two sides to this coin. If certain sentence frames can be said to accept certain words and reject others as creating absurdity, then the words so accepted or rejected can be said to share certain features which are either compatible or incompatible with the remainder of the sentence.

It was interesting to discover that, in one of his earlier papers (1938), Ryle seems to accept the two-sidedness of this coin.

"So Saturday is in bed breaks no rule of grammar. Yet the sentence is absurd. Consequently the possible complements must not only be of certain grammatical types, they must also express proposition-factors of certain logical types. The several factors in a non-absurd sentence are typically suited to each other; those in an absurd sentence or some of them are typically unsuitable to each other (p. 194)."[13] Compare the following:

*(1) sleep ideas greeen furiously colorless

*(2) colorless green ideas sleep furiously

?(3) colorless grey misery weeps ponderously

(4) colorful green lanterns burn brightly

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13 I am grateful to John Limber for bringing this article to my attention.

String (1) breaks both grammatical and semantic rules and must be read as a word list. String (2), Chomsky's classic, is not agrammatical but "asemantical" -- clashing semantically at every joint and for different reasons.[14] String (3) breaks many of the same rules

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14 Many would call some of these clashes grammatical, in the sense of breaking selectional rules (green ideas), and others really semantic, in the sense of breaking lexical rules (sleep furiously). It seems to me that we have a continuum rather than a dichotomy here. I shall return to this matter.

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as string (2), but by maintaining congruence of certain semantic features it creates a quasi-poetic meaning. And string (4) is an entirely acceptable sentence, even if less interesting than (3). Returning to the early Ryle paper (1938), we find him saying, quite appropriately: "We say that (a sentence) is absurd because at least one ingredient expression in it is not of the right type to be coupled or to be coupled in that way with the other ingredient expression or expressions in it. Such sentences, we may say, commit type-trespasses or break type-rules (p. 200)."

It was our own insight,[15] and I hope a felicitous one, that if indeed this is a two-sided coin, then it should be possible to infer

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[15] I realize that the word *insight* is also coded for "goal-achievement" and we are far from it!

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the semantic features of word forms from their rules of usage in combination with other words in appropriate syntactical frames. Let us take some verbs and try them in some frames: In the frame *It* _____. vs. *I* _____. one can make an acceptible sentence by inserting *fastened* in the first but not the second and by inserting *prayed* in the second but not the first; we may infer that *it* and *pray* contrast on some feature(s) as do *I* and *fasten* (although we need not worry about naming features at this point, it would appear that Human/Non-human and Transitive/Intransitive features are involved). Or take the alternative frames *He* _____ *her successfully* vs. *He* _____ *her unsuccessfully*. The interpersonal verbs *plead with*

and courted will go in either frame (implying that on whatever features distinguish successfully from unsuccessfully, here presumably Goal-achievement, plead with and courted are not coded); on the other hand, the verbs confided in and reminded fit easily in neither frame (implying that they contrast on some feature which successfully and unsuccessfully share, perhaps a Striving feature). Examples like these make it seem reasonable that regularities in the acceptability vs. absurdity judgments of speakers about sets of interpersonal verbs in sets of adverbial frames could be used to infer the semantic features of both sets. But some theory about how semantic features interact in the production of such judgments is required, both for asking native speakers the right questions and for interpreting their responses.

Fragment of a Theory of Semantic Interaction

I start from the notion that the meaning of a word can be characterized as a simultaneous bundle of distinctive semantic features. I assume that each of these features represents the momentary state of a single, reciprocally antagonistic representational system; this means that a word cannot be simultaneously coded in opposed directions on the same feature -- it must be either "positive", or "negative" or neither. Whether or not these features are independent of each other -- the coding of a word on one feature not restricting the coding of the same word on any other feature -- is left open at this point. The simultaneous bundle of features characterizing the meaning of a word form can be represented by a code-strip -- without anything being implied as yet about the form of the coding or, for that matter, about the psychological nature of the features. I do assume that the features

would be ordered according to some linguistic principle.

The meaning of a grammatical string of words (phrase, acceptable sentence, absurd or anomalous sentence) is assumed to be the momentary resolution of the codings on shared features when words are forced into interaction within syntactic frames. This is required by the previous assumption that the system of any single feature can only be in one state, can only assume one "posture," at a given time. Thus if one is to understand the meaning of He's a lazy athlete, the simultaneous pattern of semantic features generated cannot be only that associated with athlete or only that associated with lazy, but must be some compromise. This semantic interaction can be represented as the fusion of two or more word code-strips, according to some set of rules. Going back to Ryle's example, and assuming the simplest kind of rules, the phrase hit the target unsuccessfully might be represented,

	A	B	C	D	E	F	. . .	features
hit the target	0	—	0	+	0	+	. . .	
unsuccessfully	+	0	0	—	0	+	. . .	
	+	—	0	X	0	+	. . .	fusion,

where A, B . . . represent features, X represents antagonism on a goal-achievement feature (signal for absurdity judgment) and the + 0, or — represent simple coding directions.

When we come to the nature of the coding on features, the kind of interaction within features and the mode of combining influences across features, we must simply admit to alternative models and seek empirical answers. Coding on features could be discrete (+, 0, or —) or continuous (e.g., +3 throught 0 to —3, as in

semantic differential scaling); interactions within features could be all-or-nothing (the fusion must be antagonistic, represent the dominant sign, or be zero) or algebraic (same signs summate and opposed signs cancel); relations between features could be segregate (numbers of shared or antagonistic codings being irrelevant) or aggregate (final resolution depending upon e.g., the ratio of shared to antagonistic codings across the entire strip). Almost any combination of these possibilities is at least conceivable, and it is even conceivable that different levels of features operate according to different types of rules.[16] The kinds of rules assumed will influence both the kinds of judgments required from speakers and the

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[16] For example, "grammatical" features might be discretly coded, all-or-nothing in fusion and segregate in combination across features, whereas "semantic" features might be continuously coded, algebraic in fusion and aggregate in combination across features.

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kinds of statistical treatments that are appropriate.

We were already familiar with a general cognitive interaction model which assumed continuous coding on features (factors), segregation between features and a special type of weighted interaction within features. This was the Congruity Hypothesis. Applied to semantic differential type date, and hence affective features, it was used to predict attitutde change (Osgood and Tennenbaum, 1955) and semantic fusion under conditions of combining adjective-noun pairs, like SHY SECRETARY, BREEZY HUSBAND, SINCERE PROSTITUTE (as reported in Osgood, Suci and Tannenbaum, 1957, pp. 275-284). Referring back

to the geometric model discussed earlier, the projections of the vectors representing the two words to be combined (e.g., SHY and SECRETARY as components) into each factor independently were entered into a formula which, in effect, predicted a resolution point which was inversely proportional to the semantic intensitites of the words combined (i.e., +3 with 0 on a factor yields +3, +2 with —2 yields 0, +2 with — 1 yields +1, etc.). It was noted at the time that opposed codings (directions) on the same factor yielded what we then termed "incredulity" (e.g., for SINCERE PROSTITUTE on the E-factor). However, the model yields compromise rather than intensification when words having codings of the same sign but different magnitude are combined, and this has been a matter of experimental debate in recent years.

On the ground that denotative features, as compared with affective E-P-A features, might well be discretly coded, Forster and I devised a model which assumed discrete (+, 0, —) coding on features, all-or-nothing rather than algebraic interaction within features and, like the congruity model, segregation across features. We assumed an ordered set of rules and tried to relate them to potential judgments of combinations by speakers:

Rule I. If the strip-codes for words to be combined in a syntactic frame have opposed signs on any shared feature, then the combination will be judged semantically anomalous (e.g., happy boulder, the breaks shouted, plead with tolerantly). In cognitive dynamics more generally, this is the condition for "cognitive dissonance" or "incongruity."

Rule II. If Rule I does not apply (there are no features with opposed signs) and there are same signs on any features (either ++ or — —), then the combination will be judged semantically apposite or fitting (e.g., hopeful sign, the breaks shrieked, plead with humbly). This is the condition for intensification of meaning.

Rule III. If neither Rule I (opposed signs) nor Rule II (same signs) apply and either code-strip contains signed features whe the other is unsigned (zero), then the combination will be judged simply permissable (e.g., sad face, the breaks worked, plead with sincerely). This is the condition for ordinary modification of meaning.

Several things should be noted about this model. First, it requires three types of judgment from subjects -- anomally, appositeness and permissiveness criteria. Third, there is no summation or compromise within or across features; several opposed features do not make a combination more anomalous than one opposed feature, and several same features do not override a single opposition

In a most intriguing paper titled "The Case for Case," Charles Fillmore[17] proposes what he calls a Case Grammar which ". . . is a

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[17]As of the time of this writing, this paper has not been published (to the best of my knowledge); I borrowed a dittoed version from Professor Robert Lees; the paper is dated April 13, 1967, from Austin, Texas.

return, as it were, to the 'conceptual framework' interpretation of case systems, but this time with clear understanding of the difference between deep and surface structure. The sentence in its basic structure consists of a verb and one or more noun phrases, each associated with the verb in a particular case relationship . . . The arrays of cases defining the sentence types have the effect of imposing a classification on the verbs in the language (according to the sentence types into which they may be inserted), and it is very likely that many aspects of this classification will be of universal validity (pp. 29-30)." The case relationships which Fillmore assigns to noun phrases (subjects or objects) and verb phrases and the uses to which he puts them are clearly semantic in nature and generally similar to the approach we have been taking. The Agentive (A) Case is "the case of the animate responsible source of the action identified by the verb; Instrumental (I), the case of the inanimate force or object which contributes to the action or state identified by the verb; Dative (D), the case of the animate being affected by the action or state identified by the verb (p. 32)". . . and so forth.

There is one significant difference between Fillmore's approach and ours: Whereas he assigns what he calls "frame features" to verbs, which represent case relations between verbs and noun phrases which he believes simplify the lexicon, we assign codings to common features in each of the form classes, in the belief that this is a more generally applicable procedure. Thus, he expresses the frame feature for the verb <u>cook</u> as +[____(O A)], where either o (Objective Case)

or A (Agentive Case), or both, may occur. If both occur, we have sentences like Mother is cooking the potatoes; if only O, then we have sentences like The potatoes are cooking; and if only A, then we have sentences like Mother is cooking -- and he notes that the last is potentially ambiguous only because we are familiar with the diversity of customs in human societies! Our procedure would probably break "case" down into semantic features like ± A (animate), ± H (human), ± C (concrete) and assign them to nouns and verbs separately, letting the interactions within features thus assigned determine acceptability. But, admittedly, in this case we would have to include "semantic" features specifying subjects vs. objects as well as form-classes more generally.

It might be noted that all interpersonal verbs must be marked +A (Agentive) in relation to subject noun phrases and +D (Dative) in relation to object noun phrases -- or perhaps better, they cannot be marked --A or —D in relation to these noun phrases. This means that features associated with case relations will not be discoverable in the rules of combination of IPV's (interpersonal verbs) with AV's (adverbs) -- case features being, in effect, held constant -- but rather features "further down the line" in generality, so to speak, will have a chance of appearing. This relationship between type of linguistic sampling and level of features discoverable will become clearer in the next section.

Our Search for Empirical Discovery Procedures

A theory about meanings of word forms as componential patterns of features, about how codings on shared features interact to yield the

meanings of words in combination -- and so on -- is all very fine, but there is very little one can do with it until he can specify what the significant semantic features are. In the domain of interpersonal behavior, for example, there is little one can do about predicting similarities and differences across cultures from their usage of interpersonal verbs until one can code such verbs on a sufficient set of valid features. As already noted, intuitive discovery procedures a pretty much limited to the language of which one is a native speaker -- and of debatable validity even then. The trouble is that one's theory about semantic features is in continuous interaction with the empirical procedures on uses for discovering them. So our search has of necessity been something of a bootstrap operation, and it still is.

Problems of Sampling Linguistic Data

Sampling issues appear in many forms in an endeavor like this. There is the question of what semantic domain to investigate -- in our case this was largely decided by our interest in interpersonal behavior, although we have also worked with emtion nouns[18] -- and how openly or restrictively to define this domain. There is the question

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[18] A report on semantic interactions of emotion nouns and modifying adjectives will be made by Dr. Marilyn Wilkins and myself; it is in preparation.

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of what syntactic frames to use as complements for the items in the domain under investigation and what lexical content to give them.

Once decisions have been made on these matters there rises the question of what size sample of linguistic data is necessary, whethe it is to be drawn from natural sources or experimentally induced, whether it is to be random or systematic, and so on. And, of course there is the usual question of what subjects (speakers) to use. Early in our explorations at the University of Hawaii, in an attempt to clarify such problems, we took a reasonably random sample of 100 verbs-in-general -- the first verbs appearing on the second 100 page in James Michener's Hawaii, appropriately enough! -- and subjected them to various tests in comparison with a smaller sample of interpersonal verbs drawn from my own *a priori* analysis as previously described.

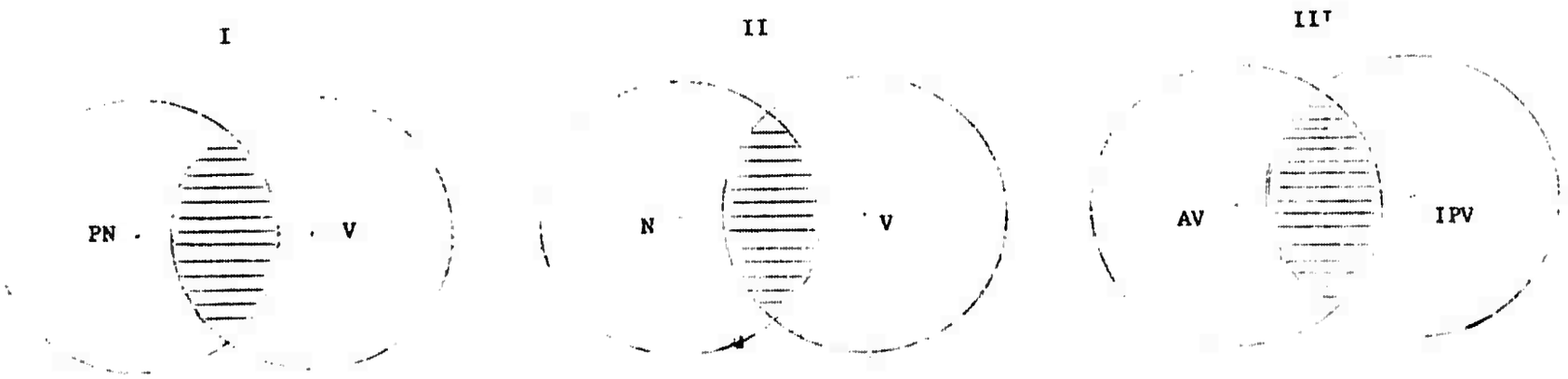
Our general procedure was to make what we termed intersections the verb class under study with various other form classes or combinations of form classes, the latter being either sentences or phrases Figure 2 illustrates some of the intersections we tried. The whole

FIGURE 2 ABOUT HERE

circles represent the entire (hypothetical) sets of the classes in question and the shaded regions of intersection represent those sub-sets of each class which are actually brought into syntactical relation. Within these intersections, all possible combinations of the two sub-sets, e.g., all PN frames with all V's in intersectic I, are created and judged for acceptability or anomaly in ordinary English. Kenneth Forster and the author were the only native speakers involved in these preliminary tests, and by no means did we always agree. The linguistic data generated by this means were some

FIGURE 2

Sample Intercepts of Verbs and Frames



times submitted to a computer program which categorizes elements of either sub-set into hierarchical "trees" in terms of similarity of usage over the other sub-set.[19] Before making some general observations about sampling, let us note briefly what happens in some of the intersections illustrated in Figure 2.

[19] This program creates similarity trees "from the ground up", so to speak. All elements are searched for the ones most similar in usage, and these are linked under a node; then the mean of these plus all remaining are searched and another node established; when a previously linked set becames most similar to another element or set, a higher node connects them; and so on. This program seems very similar to a categorizing procedure developed by S.C. Johnson of the Bell Telephone Laboratories and used by G.A. Miller and his associates (1967) for similar purposes.

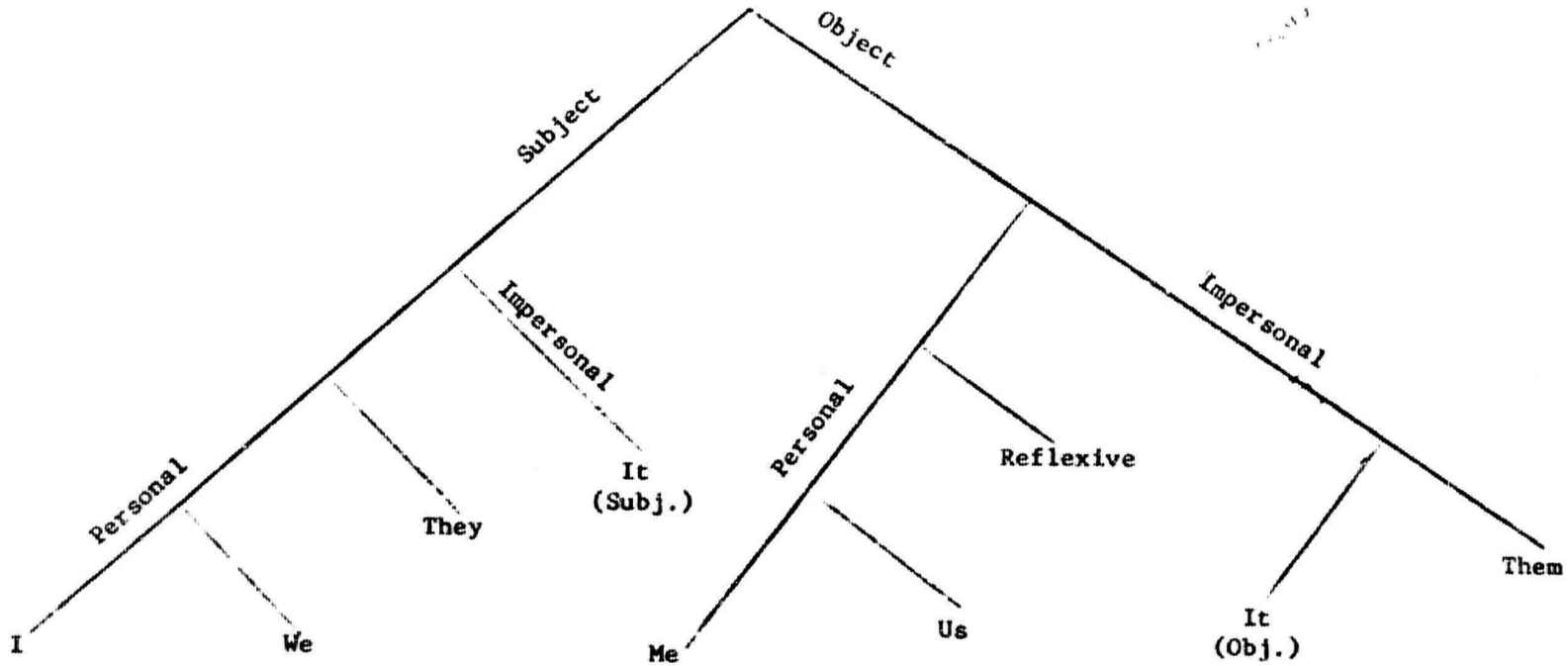
Intersection I related the sample of 100 verbs-in-general (V) to simple sentence frames of three types, composed of pronouns (PN): Type I, intransitive, I, We, It, or They __(V)__ .: Type II, transitive, They __(V)__ me, us, it or them; Type III, reflexive, I, We, It or They __(V)__ PN-self. Beyond the gross transitive and reflexive relations for verbs, there are finer distinctions in terms of which pronouns in these frames, as subjects or objects, will accept which verbs. Figure 3 displays the pronoun categorizations based upon this intersection --

FIGURE 3 ABOUT HERE

nine sentence frames in all. As expected, we find Subject vs. Object, Personal vs. Impersonal, and Singular vs. Plural categories. Perhaps less expected is the fact that they (subject) is more Personal than

FIGURE 3

Pronoun Categorization Based on Verb Intersection



them (object), where both should be coded zero on this feature, and the fact the reflexive seems more Personal than Impersonal -- the latter perhaps reflecting a tendency for reflexive verbs to require Animate subjects.

Figure 4 presents the categorization of verbs resulting from the intersection with pronouns, i.e., the inverse of the pronoun categorization. Not only is this "tree" much more complex, but it must be kept in mind that it is based on the (to some degree) fallible judgments of

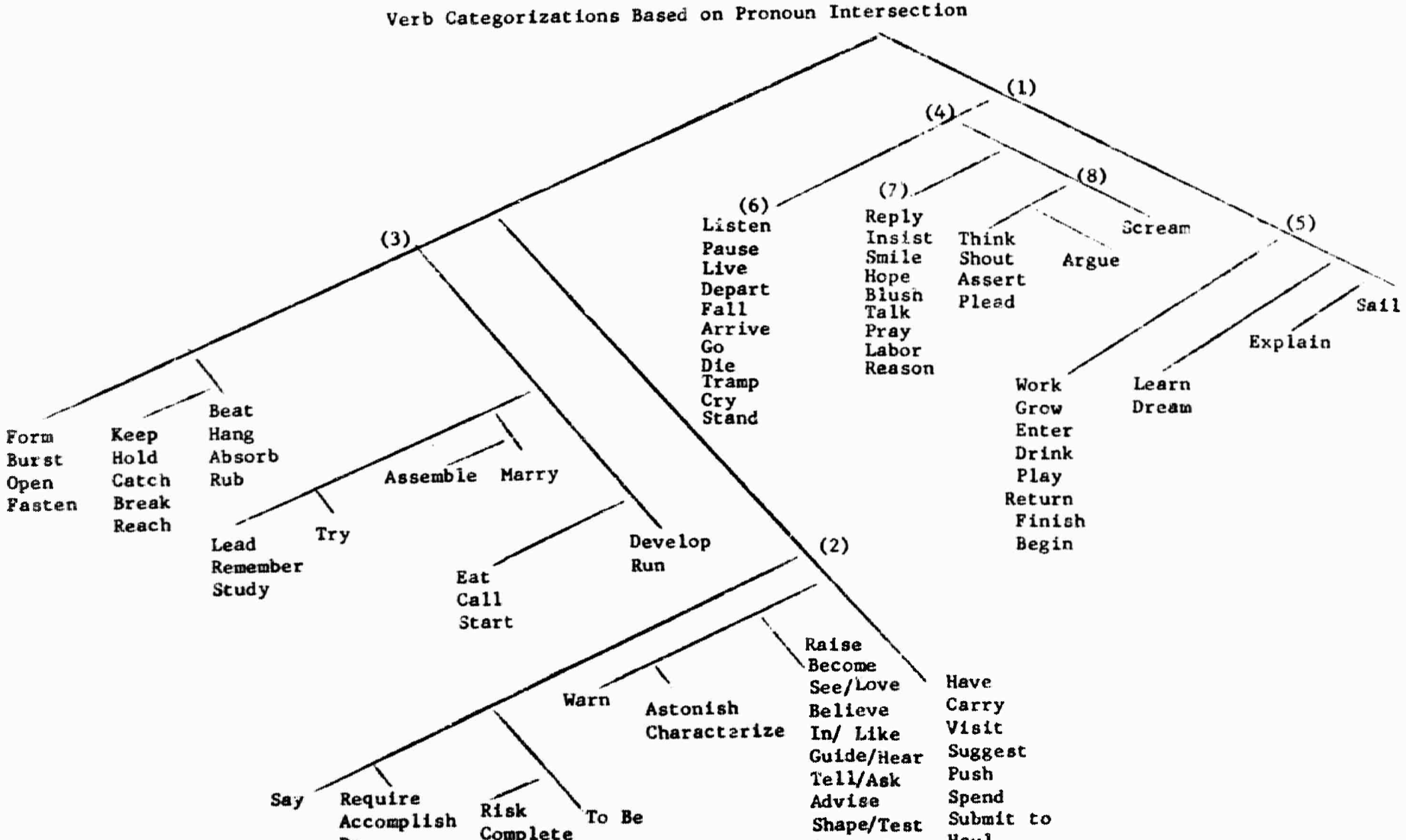
FIGURE 4 ABOUT HERE

one English speaker (CEO). As to the major categories: verbs under node (1) are characterized by taking personal subjects (I, we, they) but not personal objects (me or us); verbs under node (2) are marked in common as being necessarily transitive, i.e., they are not acceptable in frames of Type I above; verbs under node (3) have in common only that they will take both they as subjects and them as objects, but what this signifies, if anything, is obscure. Finer distinctions are made beneath these major nodes. Nodes (4) and (5) are distinguished by the fact that the latter will accept both them and it as objects while the former will accept only it, if any object. Within node (4), nodes (6) and (7) are completely intransitive, the former taking it as subject and the latter not (Reply, Insist, Hope, etc., Human coded?), whereas node (8) verbs will take it as object. Even finer distinctions appear among the "twigs" -- Personal/Impersonal (Marry me but not Assemble me, Assemble it but not Marry it), Reflexive/Non-reflexive (Study themselves but not Try themselves), for example.

In the sense of revealing features previously undiscovered, of course, these results are trivial. But in the sense of testing the adequacy of a procedure they are not. If, under appropriate sampling conditions for an intersection, such basic grammatical distinctions as Transitive/Intransitive, Personal/Impersonal, Subject/Object and the like can be obtained, then it implies both generality for the method and its potential validity in less familiar (or perhaps better, less open) semantic domains. The categories of verbs established by Fillmore via his case frames appear similar to our PN/V intersection results, but I have not been able to make a successful analysis in his terms.

FIGURE 4

Verb Categorizations Based on Pronoun Intersection



The use of an appropriate set of subject nouns and object nouns, drawn from his examples, might yield a closer relationship between his intuitive and our empirical methods. But this remains to be done systematically.

We did try an intersection of 14 plural nouns with the set of 100 random verbs, using the nouns in both a subject frame N (V) PN (or zero), e.g., Dogs (verb) them, and an object frame PN (I, they, it) (V) (PP) N, e.g., They (verb) to doctors. Because at that time we considered the noun set too small for such a large category, we did not not submit the data to the "tree" categorizing analysis -- which, after reading Fillmore, may have been a mistake. Informal inspection of the data, however, indicates expected noun categories (in terms of concrete/abstract, animate/inanimate, human/non-human). With WOMEN and DOCTORS in the subject frame, every verb is accepted, and for these nouns in the object frame the largest numbers of verbs accepted (76/100 and 74/100) -- suggesting that human languages were designed primarily to enable humans to talk about humans! What verbs will not accept WOMEN and DOCTORS as objects? One set includes verbs like form, complete, accomplish, finish and begin (verbs requiring non-animate objects?); another includes say, learn, explain, indicate and reason (verbs requiring abstract objects?); another includes die, arrive, fall, and live (intransitive verbs?). What verbs fall out wh DOGS rather than humans are subjects? Exclusively human-coded cognit processes (say, reply, insist, advise, explain, etc.), emotive processe (smile, blush, hope, pray) and activities (sail, hang, spend, and mar

Abstract ANGER and RESPECT, as subjects, accept relatively few verbs (mostly spatio-temporal generalizations like develop, grow, hold start, begin, return, but also reference to an observer like astonish and urge). Let me now return to problems of sampling.

The first general observation I have concerns the effect of restricting the domain of forms analysed: When we compare the types of features obtained from open classes (randomly selected verbs) with those obtained from more restricted classes (interpersonal verbs),[20]

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[20] Compare the types of features yield by the PN/V intersection and by the IPV/AV intersections displayed in Figures 5 - 8.

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the more open domains yield more general, "grammatical" features and the more restricted domains yield more specific, "semantic" features. The primary reason for this is that restricting the semantic domain, in effect, holds features shared by items in that domain constant and hence "undiscoverable." If we assume that the semantic component is an ordered system, with those features doing the most "work" (e.g., Abstract/Concrete) being in some way prior to those doing the least (e.g., Moral/Immoral), then this makes sense -- an efficient algorithm would look first for the distinctions that are most likely to make a difference.

My second observation concerns the nature of the syntactic frames to be used in empirical analyses. Within sentences there are what might be called "intimate" syntactic relations and more "remote" syntactic relations. In the sentence, The tall boy leaped eagerly

to the side of the fainting woman, it is obvious intuitively (as well as from immediate constituent analysis) that tall is more intimately interactive with boy than with side, that eagerly is more intimately interreactive with leaped than with woman, that boy is more intimately related to leaped than to fainting, and so forth. The more remote the syntactic relation, the weaker should be the syntactical constraints upon semantic interaction. Therefore, it would seem that semantic featues would be most clearly revealed in intersections of intimate form classes. It is also the case that the greater the complexity of syntactic frames, the greater the number of interactions that must be involved; if we change the last two words of the sentence above to decadent distatorship, whole sets of semantic relations fall into confusion. Of course, one may deliberately vary several elements of sentences sinultaneously, but this complicates matters.[21]

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[21]For example, in his disseration John Limber is simultaneously varying 10 nouns, 10 sentence frames, and 50 adjectives (e.g., N is A about it, it is A of N to do it, etc.) in an attempt to determine the interactions among these sources of variance in sentence interpretation.

The effect of size of sample upon discovery of semantic features seems to be relatively straight-forward. Given that one is working within a particular syntactic frame (or specifiable set of frames) there should be a negatively accelerated increase in the number of

features discovered as the number of items in the sample increased -- that is, the features found to determine judgments of earlier items should serve to determine later items as well, and the new features required should become progressively fewer. Of course, there is always the possibility of some new distinction being required -- such as X being closer or further from Paris than Y -- but such distinctions will not be very productive and should not inhibit one's search "in principle."[22]

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[22]This is a delayed response to a criticism posed "in principle" by Jerry Fodor several years ago in informal discussions.

Finally, as to the source of data -- in natural texts or in experimentally devised samples, in random or in systematic arrays -- I think we come here back to the basic nature of methods. At one extreme we have the purely distributional study of forms-in-contexts, as proposed hypothetically by Harris ( ); although in principle it might be possible to categorize interpersonal verbs in terms of the sharing of linguistic frames in natural texts, it would require miles and miles of text and a very heavy computer to assemble a sufficient sample of shared frames. At the other extreme we have the "compelling examples" of linguists and philosophers; here the "heaviest" computers of all do a rapid search of their memories and use their projection rules to create apposite examples, but the N is one, or a few, and compulsion is liable to lead to obsession. A middle road is one which decides upon a domain and a type of frame, selects as representative as possible a sample of each, and

then literally (experimentally) forces all possible combinations to be evaluated.

As a result of our explorations and our debates, we decided upon the following criteria for sampling with respect to the domain of interpersonal verbs: (1) That we would use a syntactic frame which most intimately relates interpersonal verbs and some other single form class -- intersections of such verbs with modifying adverbs; (2) That we would begin with a manageable set of interpersonal verbs and adverbs (30 X 20), try to determine by our methods their distinguishing features, and then expand the sample in subsequent experiments; (3) that we would use our a priori analyses of interpersonal verb features as a basis for selecting representiatve samples of verbs and modifying adverbs (coded on the same features), forcing all possible combinations within the verb/adverb syntactic frame; and (4) that we would use first ourselves, as reasonably sophisticated (and undoubtedly biased) English speakers, and then samples of ordinary English speakers (college sophomores) as subjects in judging the linguistic materials created in these procedures.

The Trouble with Trees

George Miller, assisted by Virginia Teller and Herbert Rubenstein, has been carrying on studies designed to test the potential of empirical categorizing methods for determining similarities and differences in the meaning of words.[23] The verbal items to be classi-

[23] I have not seen this work reported in detail as yet, but it is summarized in the Seventh Annual Report (1966-67) of the Center for Cognitive Studies at Harvard University and in Miller (1967)

fied are sorted into piles by judges, as many piles as are felt required. These sorting data are analysed by a computer program[24]

[24]See footnote 19.

that joins items under nodes progressively -- first groups of items that are placed in the same piles by the most subjects and finally by the fewest subjects. Application of this procedure to 48 word-forms which could function either as nouns or as verbs in English (e.g., kill, aid, inch, mother), but with a set for nouns, yielded the tree shown here as Figure 5. Labelings of the major categories are

FIGURE 5 ABOUT HERE

inferential, of course, but they are similar to what I have referred to as Abstract/Concrete, Animate/Inanimate under Concrete and Human/Non-human under Animate -- the distinctions within Abstract are less familiar (Social/Personal/Quantitative). One advantage of this procedure is that the hierarchical ordering of features in terms of generality and clarity of usage comes out directly in terms of the numbers of native speakers agreeing on co-assigning items. A disadvantage, as I see it, is that by using words in isolation rather than in syntactic frames it allows this powerful syntactic factor to vary randomly. It is interesting that"when the 48 words.. were presented as verbs in another study, neither the object-concept distinctions appeared nor did anything else that was recognizable (p. 23)." I think that this was precisely because the semantic features of verbs depend heavily upon the syntactic frames in which they participate, and this factor does not enter into the Miller, et. al discovery procedure.

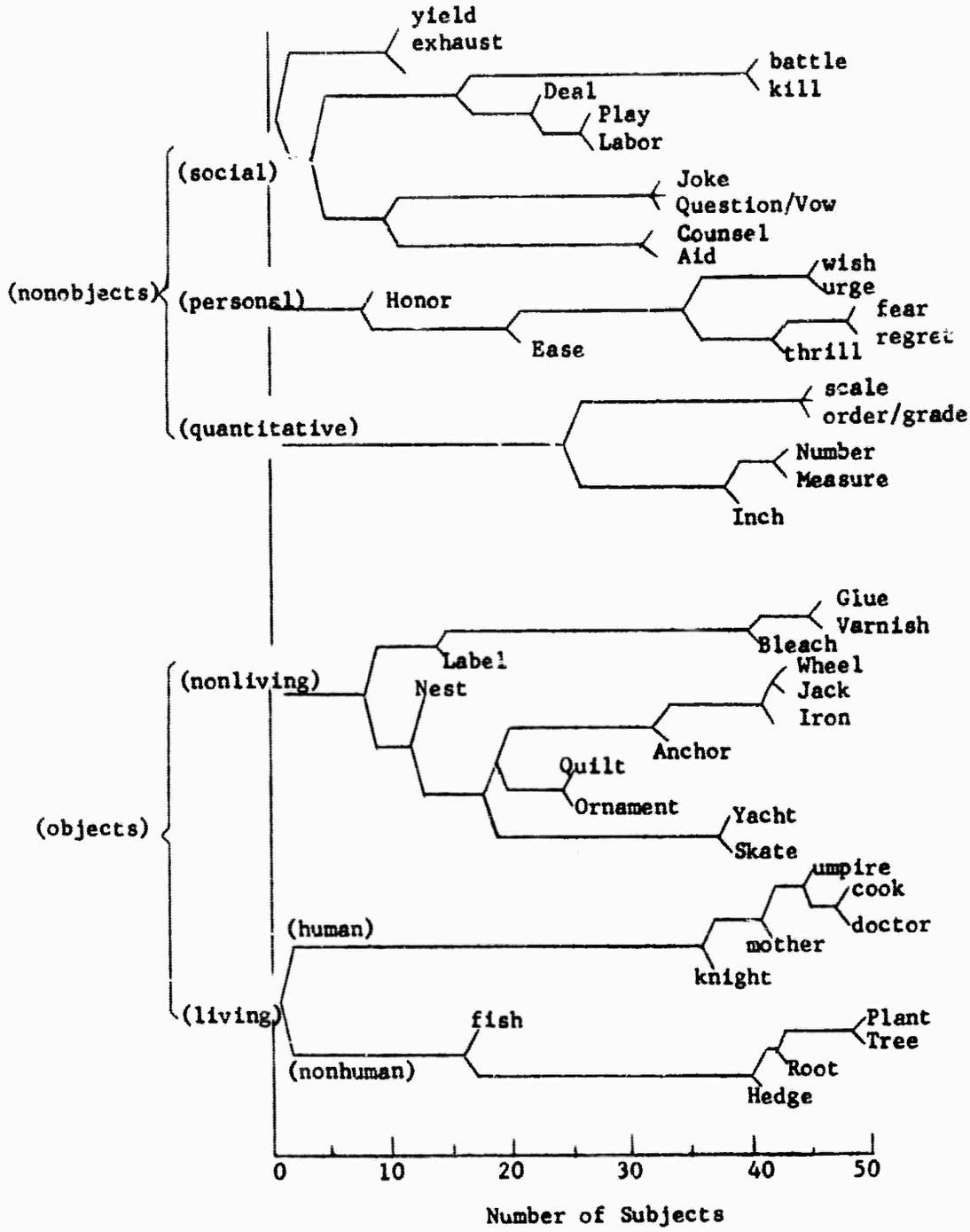


FIGURE 5

Results of a Cluster Analysis of 48 Nouns
(Miller, Teller, and Rubenstein)

Our own initial approach to the differentiation of interpersonal verbs was also through a categorizing procedure -that described in the preceding section of this paper. It differs from Miller's in that (a) similarities among one set of items (IPV's) depend upon similarities of usage across syntactic frames involving another set of items (AV's) and (b) inter-subject agreement does not enter directly into the process--indeed, single-subject analyses are feasible and are employed. The linguistic data determining the "trees" to be reported in this section were derived from the intersection of 30 IPV's (drawn from my earlier a priori analysis) with 20 AV's (selected to give some representation to the same 10 a priori features used for the IPV's).

The frame was simply IPV AV, in all possible 600 combinations, e.g., humiliate firmly, plead with hopefully, corrupt excitedly, and so forth.

Figures 6 and 7 compare the IPV trees generated in this manner from the judgements of Kenneth Forster (Figure 6) and myself (Figure 7). The over-all similarities in structure are apparent--for example,

FIGURES 6 AND 7 ABOUT HERE

in the basic division into Associative (right branch) and Dissociative (left branch) behaviors and the subdivision of the latter into Immoral (Disable, Corrupt, Humiliate, Bewilder) and Not-immoral (Contradict, Punish, Blame, Oppose, Defy) Dissociative behaviors--but there are many fine differences. As indicated by circling, Osgood considers Ridicule Immoral--Forster does not; Forster links Borrow from, Appease, Indulge, Imitate and Evade with clearly Dissociative behaviors--Osgood links them all with Associative behaviors. In discussion between us, it became apparent that some of our differ-

FIGURE 6
IPV Tree Based on IPV/AV Intersection (Forster Data)

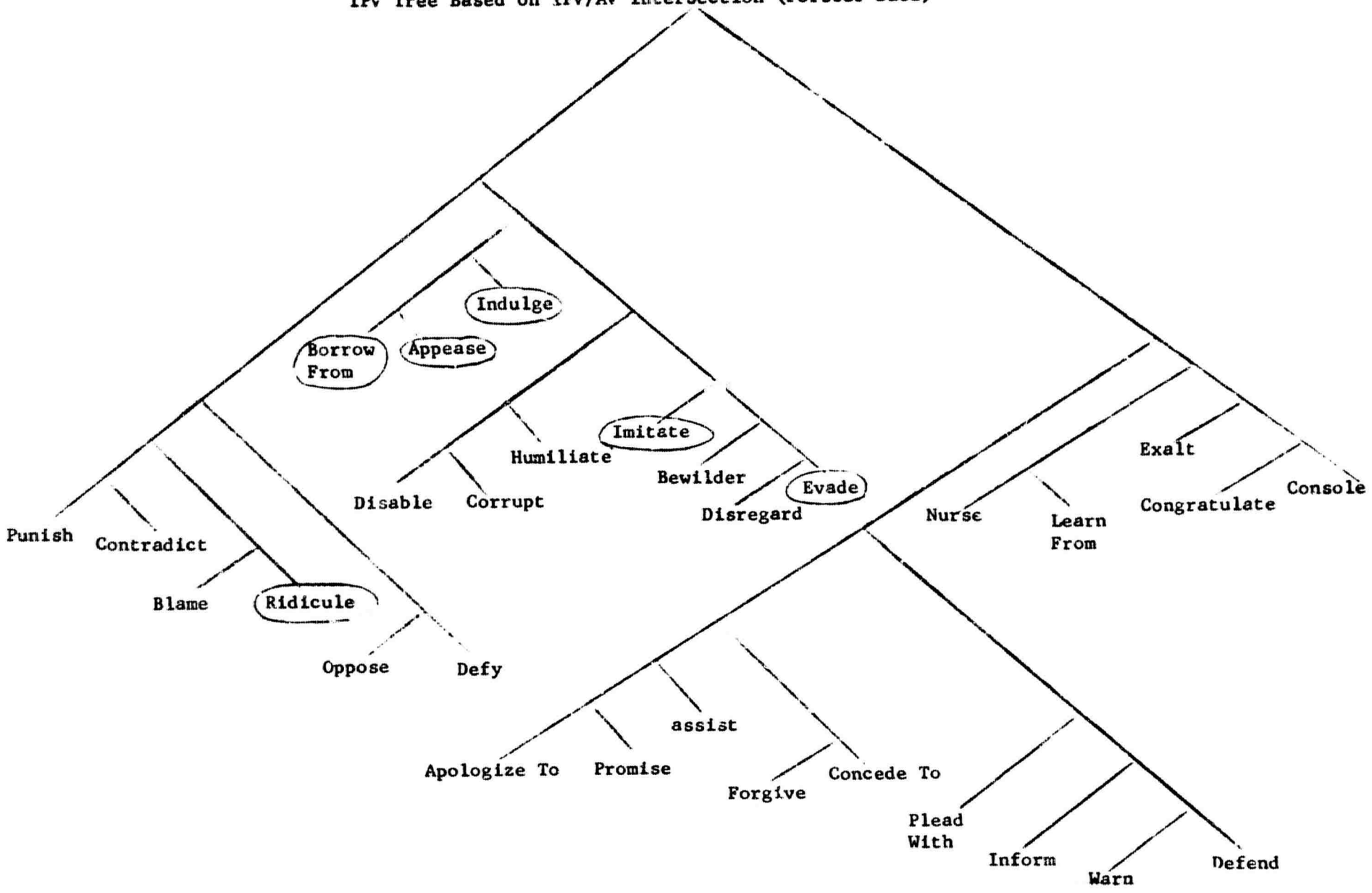
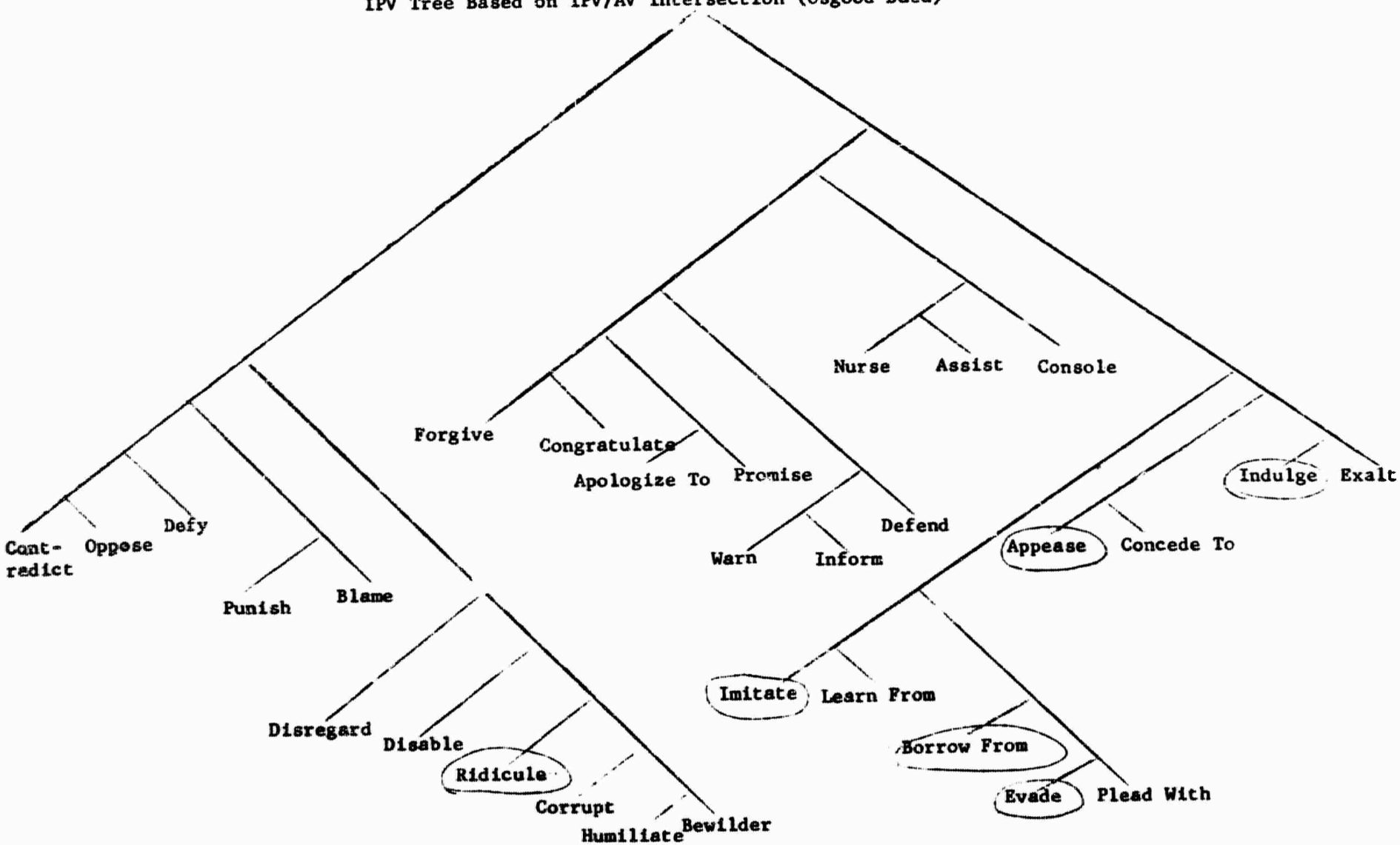


FIGURE 1
IPV Tree Based on IPV/AV Intersection (Osgood Data)



ences reflected either errors in our judgements or inadequacies in the method--for example, KF's Ridicule not being Immoral and CO's Evade not being Dissociative. On the other hand, there were some real differences in our semantics, how we thought certain verbs ought to be coded--for KF Indulge, Appease, Imitate and Borrow from were clearly Dissociative and somewhat Immoral interpersonal intentions, whereas for me they were clearly Associative intentions, albeit a bit tinged with immorality. Our differences on PARENT Indulging CHILD were sharp--clearly immoral for him, clearly not for me. Perhaps it should be in the record that Forster speaks Australian English and I speak American!

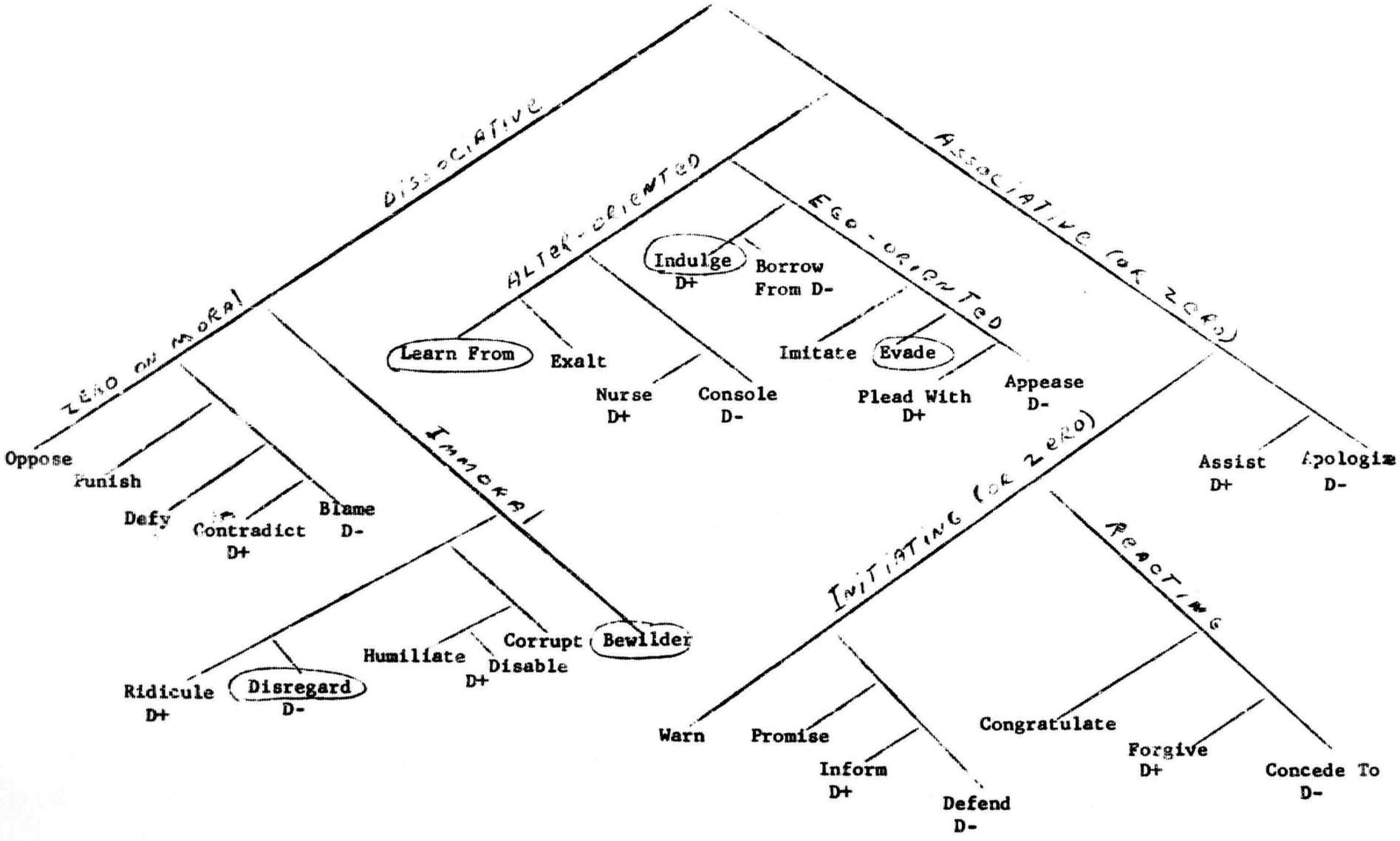
What would a sample of "ordinary" English speakers tell us? We asked the graduate students in my seminar in psycholinguistics at the University of Hawaii (about 20 people) to perform the same task on the same materials. Although they were by no means "ordinary" English speakers--including Chinese, Fillipinos, Canadians and residents in Hawaii as well as from the Mainland--they produced a tree more consistent over-all than either of ours, at least in my opinion. On Figure 8 I have circled some of the interesting

FIGURE 8 ABOUT HERE

items: Evade is still Associative as it was for me; for some reason I do not fathom; the students agree with me about Indulge being Associative, but also with both KF and CO about Disregard and Bewilder being Immoral, which seems strange; the fact that the students use Learn from in a fashion similar to Exalt (rather than like Nurse by KF and like Imitate by CO) may simply reflect their student status By checking the limbs, branches and twigs of the student tree against my a priori features for these verbs, it is possible to make some

FIGURE 8

IPV Tree Based on IPV/AV Intersection (Subject Data)



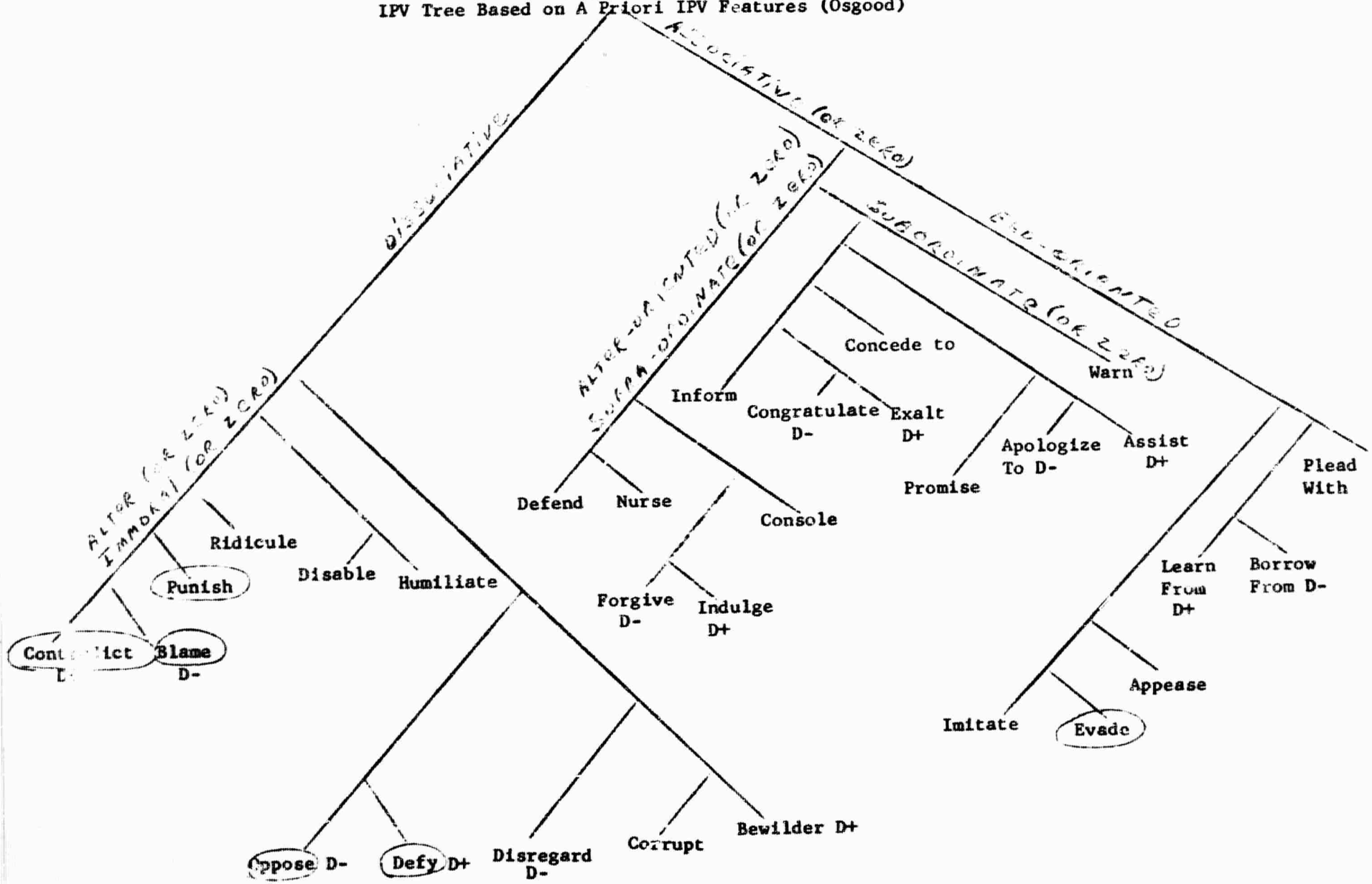
feature assignments: An Alter-oriented/Ego-oriented feature and an Initiating/Reacting feature appears within the Associative set, and a Moral/Immoral feature divides the Dissociative set. A careful inspection of the terminal twigs suggests that a kind of Dynamism feature (Potent and Active/Weak and Passive) is making common distinctions at this level--indicated in Figure 8 by the assignments of D + and D -. This illustrates one of the troubles with trees--the lower the order or significance of a feature, the more dispersed will be its operation over the tree and hence the more difficult it will be to identify.

As an internal check on tree categories as discovery procedures, we decided to create an IPV tree directly from a priori feature codings. The 20 adverbs were carefully coded on the same 10 features (e.g., firmly was + Potent, + Supraordinate, + Deliberate and 0 on all other features). Then the code-strips of IPV/AV pairs were used to generate the "judgements" of anomalous (one or more opposed codings), apposite (no opposed and one or more same codings) and permissible (no opposed and no same codings) combinations for all 600 items. In a sense, we were testing a "native speaker" whose semantics we knew absolutely. Figure 9 presents the

FIGURE 9 ABOUT HERE

resulting tree. Here we can do a better job of identifying features, as would be expected: The Associative/Dissociative limbs are nearly perfectly consistent with the a priori codings of the IPV's, with the single misplacement of Evade again. A major subdivision of both the Associative and Dissociative limbs is into Alter-oriented/Ego-oriented branches, and all verbs are perfectly allocated, with the

FIGURE 9
IPV Tree Based on A Priori IPV Features (Osgood)



single exception of Corrupt (which is coded as Alter-oriented as contrasted with Seduce, for example)--but we notice that an Immoral/Not Immoral feature overlaps with Alter/Ego on the Dissociative side. The Associative Alter-oriented set is further subdivided into Supraordinate/Subordinate, and without errors. Again, inspecting the terminal twigs, we find the same dispersed Dynamism feature, indicated in the Figure by D + vs. D -. However, we find no clear evidence for an Initiating-Reacting feature, for a Future-oriented/Past-oriented feature, for a Terminal/Interminal feature or for a Deliberate/Impulsive feature. Of course, these latter a priori features may well be Osgoodian fictions.

What is the trouble with trees? For one thing, it seems that very slight distinctions, if they are on a higher order feature, can override many other similarities. A strictly hierarchical system may not be appropriate for finer semantic features. For another, as the a priori analysis shows, the methodology of tree-making is capable of mis-assigning items (Evade and Corrupt, for example), although the reason for this is not clear. For yet another lower order but still significant features are so dispersed among the twigs that (without already knowing what they are) they get lost to view. And another, branches may be co-determined by more than one feature, and if one does not know the features already they would not be independently discoverable. But there is a quite different and more serious trouble with trees: Even though one can derive trees for both members of an intersection (here, IPV's and AV's), each based on usage with respect to the other, there is no rigorous way we could discover to relate the categories of one to

the categories of the other. Yet, our theory is based on the notion of interaction within shared features among the words in the two sets.

Before leaving them I should say something nice about trees. The fact that an empirical tree based on the judgements of real speakers (Figure 8) matches as well as it does a tree generated from a small set of a priori semantic features (Figure 9) is very encouraging. It encourages me to believe that an empirical discovery procedure is at least possible.

Factor and Feature Analysis Methods

Since factor analytic procedures are generally familiar, I will not detail them here. The data entering the analysis may consist of discrete judgements (like the apposite, permissable and anomalous judgments in our IPV/AV intersections) or scaled judgments (like the semantic differential). Although analyses of single subjects may be run, it is more usual to use the mean or median ratings or judgments for groups of subjects. These values are entered in a rectangular matrix, with columns defined by IPV's and rows defined by scales or AV's, as the case may be. In an IPV factor analysis, each verb column is correlated with every other verb column, generating a triangular verb/verb correlation matrix; high positive correlations indicate similar usage, low correlations independent usage, and high negative correlations indicate opposite usage. Factor analysis serves to cluster together those verbs which, as indicated by large factor loadings, share certain dominant characteristics in usage--not necessarily the same, single semantic feature--and if orthogonal solutions are obtained these characteristics will be independent of each other. An obverse factor analysis

may be made of the scales or AV's, or--more simply--the factor scores (projections) of these variables onto the verb factor can be used; in either case, verb and adverb usages are being directly (mathematically) related.

What kind of a semantic theory and what kinds of semantic interactions are assumed by the use of this measurement model? It assumes, first, that the codings on features are continuous; second, it assumes that the interactions of word-meanings on features are continuous or algebraic; third, although the factors may be orthogonal, it allows the possibility that subjects' judgements of combinations may be based upon algebraic summations of signs across features--thus aggregate--and therefore that each single judgement may reflect the influence of more than a single underlying feature. It is important to realize that the factor analytic method will be appropriate to the degree to which the true semantic model approximates these characteristics.

What kind of a measurement model is appropriate for the kind of semantic theory Forster and I postulated as one reasonable possibility? It will be recalled that this model assumed (a) discrete (+, 0, -) coding on features, (b) segregation across features, and (c) all-or-nothing resolutions within features for word combinations (+ + equals +; - - equals -; + 0 equals +; - 0 equals -; and + - equals X or anomaly). There appeared to be no familiar quantitative measurement model that would serve both to relate IPV and AV features and to satisfy these rather unusual assumptions. So we tried to devise such a measurement procedure from scratch.[25] Although we

[25]For several months in Hawaii there was a continuous interplay between what could fairly be called brain-storming, programming, and evaluating results. Since Forster plays a computer like some people play an organ, the intervals between these processes were amazingly brief.

never quite succeeded to our own satisfaction--and in fact can now demonstrate that even our final version has what are probably irremovable "bugs"--nevertheless, with a somewhat relaxed criterion, the results we obtained were interesting and therefore I describe this method briefly.

We begin with what we call a target matrix. This is a verb X adverb matrix of judgements (individual or group median) of the anomaly (-1), permissibility (0) or appositeness (+1) of all IPV/AV pairings. In the sense of linguistic distributional analysis, each IPV appears in a set of AV contexts and each AV appears in a set of IPV contexts; we are thus using"context-sensitivity" as a means of inferring semantic features.[26] We use the term "target

[26]Cf., Chomsky (1965), pp. 90-95.

matrix" because it is this particular pattern of judgements about the acceptability of combinations of words that we wish our empirical method to predict. This matrix is also the input data to our Feature Analysis program. The problem is: what do we do with this information in order to discover the underlying semantic features which, in theory, have determined the pattern of judgements?

The same program that generates trees "from the bottom up" is applied to the target matrix in order to isolate a small set

of IPV's that are maximally similar in usage across the AV's--perhaps it turns out to be Promise, Apologize to, Appease. These three IPV's are automatically assigned + on the first trial feature. The computer then assigns codings on this trial feature to all of the adverbs, + if an AV in the target matrix is + 1 with all three of these IPV's, - if it is -1 with all three, and 0 under all other conditions. The computer then applies the clustering program to the AV's in the target matrix in search of two or more which are clustered and have the same relation (either +1 or -1) with respect to the three IPV's--perhaps they turn out to be desperately and submissively, both with +1 (apposite) relations to the verbs in question. Then it assigns appropriate codings to all of the remaining IPV's in terms of their relations to these two AV's in the target matrix. We now know that this is one of the weak points in the procedure; both the verb and the adverb "pivots" typically have more than one feature in common, and therefore the automatic feature assignments may be in terms of one feature in some cases and terms of another in other cases. Ideally, we would like to have IPV and AV words with single-feature codings; this is approximated in some adverbial modifiers (e.g., sincerely is coded + on Moral and 0 on all other features), but it never occurs in verb heads, according to our a priori codings.

The computer now uses this first trial feature to generate a predicted matrix. It compares each IPV with each AV on this single feature and "predicts" appositeness (if IPV and AV have the same sign), permissiveness (if IPV or AV or both have 0), and anomaly (if IPV and AV have opposite signs). Obviously there will be many errors with only one feature, but there are both patchable and

unpatchable errors: patchable errors are those which, given the semantic theory being tested, can be corrected by additional features (e.g., a predicted +1 when the target says -1 can be changed to -1 by any subsequent feature with opposed signs, and similarly for predicted 0 and either target +1 or -1); unpatchable errors are those which cannot be corrected by additional features, given the characteristics of this theoretical model (e.g., a predicted -1 when the target says +1, since a single opposition is sufficient, or a predicted +1 or -1 when the target says 0, since permissiveness only can occur when there are neither same or opposed signs in the code-strips). To facilitate the computer corrections, the predicted matrix inserts values of 90 in unpatchable-error cells, 1 in patchable-error cells and 0 in correctly predicted cells. The computer is programmed to "decide" on the most efficient way to eliminate unpatchable errors by recoding the smallest number of IDV's or AV's on this first trial feature.[27]

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[27] We have corrected to a criterion of 95% unpatchable errors, rather than 100% at each cycle, in order to allow for some native-speaker error--100% correction would be too tight.

The target matrix is reduced to zeros for all correctly predicted cells by the first feature--on the (probably erroneous) assumption that this first feature has accounted for all relations it correctly predicts--and the same series of linked programs reiterates, generating a second trial feature. The computer now uses both trial features simultaneously to predict the target matrix (any opposed-sign feature predicts -1, etc.). On the basis of the patchable and unpatchable errors, the second feature is modified. The target matrix is then further reduced by substituting zeros for correct predictions. This iteration process can be stopped at any point; we have used 10% unpatchable errors in a residual matrix following N reiterations as a criterion. The hope is that the number of hypothetical features will be much smaller than the number of either verbs or adverbs and that these features will be interpretable by inspection of the verbs and adverbs which have + and - signs on them.

Intuitive vs. Empirical Features

Throughout all of these studies I have used myself as a preliminary guinea pig -- executing exactly the same tasks that the subjects would face (but not always with the proscribed methods) -- and have used my own processed data as a kind of criterion for the group results.[28] I am certainly a dedicated and, I hope, sensitive native speaker, and, being aware of a wider variety of potential semantic features than the "ordinary" speaker, it seemed that my own computed results could serve as a guide for interpreting and evaluating the group results. What I did in the IPV/AV intersection experiments was to first react to each of the 600 combinations, only inserting a +1 or a -1 for those combinations which I considered to be incontrovertably correct and indicating these in the "target matrix" in red ink; then I asked myself "why" these items were so intuitively obvious; given each answer to this "why" (again, undoubtedly biased), I proceed to resolve other combinations on these terms, but in ordinary pencil; my own "target matrix" was then submitted to the same factor and feature analysis programs.

These intuitively derived solutions have the major purpose of aiding interpretation of the complex, multidimensional empirical results with samples of "ordinary" native speakers. If one reads a list of those IPV 's loading high and low on a given factor or

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[28] I am not in this case referring to the a priori analysis of the semantic features of interpersonal verbs; that was done explicitly as an intuitive approach.

feature in a computer print-out without "having a particular feature in mind", it is usually very confusing (EXAMPLE: + Oppose, Defy, Corrupt, Warn, Promise, Nurse, Borrow from, Plead with versus — Punish, Blame, Ridicule, Apologize, Congratulate, Console, Concede to). The reason is that each word form is simultaneously coded on many features, only one of which is presumably being consistently contrasted in the factor or feature array. If, on the other hand, one does have a specific semantic feature in mind, the array may have sharp meaningfulness (try the feature, Future-oriented/Past-oriented, on the above example). The intuitively derived solutions also serve another purpose -- to provide data against which to evaluate the empricial methodology itself. I will come back to this point.

I am sure that some linguists and phiosophers will ask -- why bother with empirical tests at all? Isn't your own competence as a native speaker, coupled with your training as a scientist, a more valid instrument for making fine discriminations among the meanings of words than a casual (if not bored) college sophomore ? This may be true, but it is also the garden path to "scholarly schizophrenia." We already have evidence in the IPV trees for Forster and Osgood that two native speakers of the same language can have honest differences in their semantic codings of words -- can this not also hold for inferred features? Furthermore, as noted earlier, the intuitions of even the most sophisticated native speaker of Language A are likely to be misleading when he wades into Language B.[29] What we would prefer

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[29]Within any given language, there could be a fruitful "mix" of

sophisticated native speaker and empirical checks -- a kind of computerized lexicography.

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is a rigorous empirical discovery procedure that can be applied "blindly" to appropriate samples of linguistic data from any language and yield semantic features.

Some Results to Date

We may look first at a factor analysis of my own IPV/AV target matrix, generated deliberately with my own a priori features in mind. The question is whether or not the resulting factors correspond in any obvious way with my features. Table 6 presents the results of such a factor analysis, along with an Equimax rotation.[30] In this case, AV factors were obtained and IPV's were given factor scores on

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[30]I wish to express my thanks to Kenneth Forster, who made all of the computer analyses of these early IPV/AV matrices after returning to Melbourne, Australia.

---

them. Table 6 lists, for each rotated factor, the highest positive and highest negative verbs along with their a priori code-strips. Factor I is most clearly the dominant Associative/Dissociative feature

TABLE 6 ABOUT HERE

with some Moral/Immoral and Subordinate/Supraordinate flavors; the adverb factor loadings corroborate this interpretation (sincerely and considerately versus unfairly meanly and despicably). Factor II clearly differentiates Supraordinate/Subordinate IPV's, but here there is some fusion of Supraordinateness with Alter-orientation,

Osgood Output and A Priori Features Compared;
Factor Analysis (Equimax Rotation) of a 30 IPV/20 AV Matrix

	Factor Scores	A Mo / Immoral	B Potent / Impotent	C Active / Passive	D Associative / Dissociative	E Initiating / Reacting	F Ego- / Alter	G Supra / Sub	H Terminal / Interminal	I Future / Past	J Deliberate / Impulsive
		?			*			?			
Factor I											
apologize	1.18	+	-	0	+	-	0	-	+	-	+
promise	1.16	0	0	0	+	0	0	0	+	+	0
concede to	1.11	0	-	-	+	-	-	-	+	-	+
defend	1.09	+	+	0	+	0	-	0	-	+	0
disable	-1.67	-	+	+	-	0	0	+	+	+	+
humiliate	-1.55	0	0	0	-	+	-	+	+	0	0
ridicule	-1.47	-	0	+	-	-	-	+	+	-	-
blame	-1.31	0	0	0	-	-	-	+	+	-	0
				?	?		?	*			
Factor II											
learn from	1.85	0	0	0	0	0	+	-	0	+	+
borrow from	1.61	0	0	0	0	+	+	-	+	+	+
apologize	1.44	+	-	0	+	-	0	-	+	-	+
plead with	1.38	0	0	0	0	+	+	-	0	+	0
humiliate	-1.38	0	0	0	-	+	-	+	+	0	0
punish	-1.27	0	+	+	-	-	-	+	+	-	0
disable	-1.27	-	+	+	-	0	0	+	+	+	+
ridicule	-1.22	-	0	+	-	-	-	+	+	-	-
			?		?			*			
Factor III											
punish	-1.76	0	+	+	-	-	-	+	+	-	0
humiliate	1.76	0	0	0	-	+	-	+	+	0	0
blame	1.72	0	0	0	-	-	-	+	+	-	0
contradict	1.72	0	0	0	-	-	0	+	+	-	+

	Factor Scores	A Moral Immoral	B Potent Impotent	C Active Passive	D Associative Dissociative	E Initiating Reacting	F Ego- Alter	G Supra Suo	H Terminal Interminal	I Future Past	J Deliberate Impulsive
Factor III (cont.)											
assist	-1.26	0	-	+	+	0	-	-	0	+	+
learn from	-1.27	0	0	0	0	0	+	-	0	+	0
borrow from	-1.11	0	0	0	0	+	+	-	+	+	+
apologize to	-1.10	+	-	0	+	-	0	-	+	-	+
Factor IV							?			*	
borrow from	1.31	0	0	0	0	+	+	-	+	+	+
appease	1.27	0	-	-	+	-	0	0	0	0	0
learn from	1.27	0	0	0	0	0	+	-	0	+	-
plead with	1.26	0	0	0	0	+	+	-	0	+	0
oppose	1.00	0	+	0	-	0	+	0	-	+	0
punish	-1.65	0	+	+	-	-	-	+	+	-	0
contradict	-1.53	0	0	0	-	-	0	+	+	-	+
blame	-1.53	0	0	0	-	-	-	+	+	-	0
exalt	-1.25	+	+	+	+	+	-	-	+	-	-
Factor V							?	?			?
disable	2.03	-	+	+	-	0	0	+	+	+	+
humiliate	2.01	0	0	0	-	+	-	+	+	0	0
corrupt	1.71	-	0	0	-	+	-	+	-	+	+
nurse	1.23	0	0	+	+	0	-	+	-	+	0
imitate	-1.57	0	-	+	0	-	+	-	0	0	0
plead with	-1.43	0	0	0	0	+	+	-	0	+	0
promise	-1.40	0	0	0	+	0	0	0	+	+	0
defy	-1.13	0	+	+	-	-	+	0	0	+	-

Table 6 (cont.)

		A	B	C	D	E	F	G	H	I	J
	Factor Scores	Moral Immoral	Potent Impotent	Active Passive	Associative Dissociative	Initiating Reacting	Ego- Alter	Supra Sub	Terminal Interminal	Future Past	Deliberat Impulsive
Factor VI		?			?				?		
defend	1.75	+	+	0	+	0	-	0	-	+	0
nurse	1.72	0	0	+	+	0	-	+	-	+	0
indulge	1.60	0	0	0	+	-	-	+	0	0	-
forgive	1.47	+	0	0	+	-	-	+	+	-	0
ridicule	-1.29	-	0	+	-	-	-	+	+	-	-
contradict	-1.12	0	0	0	-	-	0	+	+	-	+
plead with	-1.12	0	0	0	0	+	+	-	0	+	0
inform	-0.96	0	0	0	0	+	-	0	+	0	0
Factor VII					*		*				
concede to	1.34	0	-	-	+	-	-	-	+	-	+
congratulate	1.32	0	0	0	+	-	-	0	+	-	+
forgive	1.30	+	0	0	+	-	-	+	+	-	0
nurse	1.26	0	0	+	+	0	-	+	-	+	0
defy	-1.34	0	+	+	-	-	+	0	0	+	-
disable	-1.26	-	+	+	-	0	0	+	+	+	+
oppose	-1.16	0	+	0	-	0	+	0	-	+	0
evade	-1.11	0	-	+	-	-	+	0	0	0	0

Dissociation and Activity (a not too surprising human pattern!); the adverb factor loadings are again consistent (angrily, drastically and emphatically vs. submissively, reluctantly, guiltily and desperately). Factor III simply repeats the Supraordinate/Subordinate distinction -- for some unfathomable reason -- but now with firmly one of the defining adverbs. Factor IV seems to clearly isolate the Future-oriented/Past-oriented a priori feature, along with Ego (Future)/Alter (Past) characteristics; the defining adverbs are hopefully, successfully, and desperately. Factors V and VI do not yield to any obvious interpretation for verbs; the adverbs make V look like our Deliberate/Impulsive feature (firmly vs. impulsively) and VI look like our Terminal/Interminal feature (rapidly and emphatically vs. hopefully and appreciatively). Factor VII is our Alter-Ego feature (again fused with Associative/Dissociative); contrasts between considerately, sincerely, appreciatively and selfishly, meanly, unfairly confirm this interpretation.

Before evaluating this result, let us look at the parallel analysis using the specially devised Feature Program. Table 7 presents these results in a format similar to the previous table,

TABLE 7 ABOUT HERE

except that simple signs (+ or —) replace factor scores for both IPV's and AV's. Feature I appears to be some combination of Terminal-Potent-Active versus Interminal-Impotent-Passive -- a rather reasonable patterning -- and this is confirmed by the adverbs identified by the same feature combination (emphatically, angrily, drastically vs. hopefully, considerately, submissively). Feature II is clearly the

Table

Osgood Output and A Priori Features Compared;
Feature Analysis of a 30 IPV/20 AV Matrix

		A	B	C	D	E	F	G	H	I	J
	Feature Sign	Moral / Immoral	Potent / Impotent	Active / Passive	Associative / Dissociative	Initiating / Reacting	Ego- / Alter	Supra / Sub	Terminal / Interminal	Future / Past	Deliberate / Impulsive
Feature I			?						?		
punish	+	0	+	+	-	-	-	+	+	-	0
disable	+	-	+	+	-	0	0	+	+	+	+
contradict	+	0	0	0	-	-	0	+	+	-	+
ridicule	+	-	0	+	-	-	-	+	+	-	-
corrupt	-	-	0	0	-	+	-	+	-	+	+
disregard	-	0	0	-	-	-	0	0	-	0	+
console	-	+	0	0	+	-	-	0	0	-	-
appease	-	0	-	-	+	-	0	0	0	0	0
Feature II					*						
defend	+	+	+	0	+	0	-	0	-	+	0
forgive	+	+	0	0	+	-	-	+	+	-	0
assist	+	0	-	+	+	0	-	-	0	+	+
nurse	+	0	0	+	+	0	-	+	-	+	0
blame	-	0	0	0	-	-	-	+	+	-	0
disable	-	-	+	+	-	0	0	+	+	+	+
corrupt	-	-	0	0	-	+	-	+	-	+	+
humiliate	-	0	0	0	-	+	-	+	+	0	0
Feature III					?		*				
defy	+	0	+	+	-	-	+	0	0	+	-
corrupt	+	-	0	0	-	+	-	+	-	+	+
learn from	+	0	0	0	0	0	+	-	0	+	+
plead with	+	0	0	0	0	+	-	-	0	+	?

Table 7 (cont.)

Feature III (cont.)	Feature Sign	A Moral / Immoral	B Potent / Impotent	C Active / Passive	D Associative / Dissociative	E Initiating / Reacting	F Ego- / Alter	G Supra / Sub	H Terminal / Interminal	I Future / Past	J Deliberate / Impulsive
defend	-	+	+	0	+	0	-	0	-	+	0
congratulate	-	0	0	0	+	-	-	0	+	-	+
console	-	+	0	0	+	-	-	0	0	-	-
indulge	-	0	0	0	+	-	-	+	0	0	-
Feature IV								*			
punish	+	0	+	+	-	-	-	+	+	-	0
ridicule	+	-	0	+	-	-	-	+	+	-	-
humiliate	+	0	0	0	-	+	-	+	+	0	0
forgive	+	+	0	0	+	-	-	+	+	-	0
apologize	-	+	-	0	+	-	0	-	+	-	+
borrow from	-	0	0	0	0	+	+	-	+	+	+
plead with	-	0	0	0	0	+	+	-	0	+	0
concede to	-	0	-	-	+	-	-	-	+	-	+
Feature V		*			?						
forgive	+	+	0	0	+	-	-	+	+	-	0
concede to	+	0	-	-	+	-	-	-	+	-	+
disable	-	-	+	+	-	0	0	+	+	+	+
corrupt	-	-	0	0	-	+	-	+	-	+	+
ridicule	-	-	0	+	-	-	-	+	+	-	-
bewilder	-	0	0	+	0	0	0	+	0	0	0
Feature VI											*
indulge	+	0	0	0	+	-	-	+	0	0	-

Table 7 (cont.)

Feature VI (cont.)	Feature Sign	A Moral / Immoral	B Potent / Impotent	C Active / Passive	D Associative / Dissociative	E Initiating / Reacting	F Ego- / Alter	G Supra / Sub	H Terminal / Interminal	I Future / Past	J Deliberate / Impulsive
console	+	+	0	0	+	-	-	0	0	-	-
forgive	+	+	0	0	+	-	-	+	+	-	0
defy	+	0	+	+	-	-	+	0	0	+	-
concede to	-	0	-	-	+	-	-	-	+	-	+
disregard	-	0	0	-	-	-	0	0	-	0	+
disable	-	-	+	+	-	0	0	+	+	+	+
corrupt	-	-	0	0	-	+	-	+	-	+	+
Feature VII									?		
promise	+	0	0	0	+	0	0	0	+	+	0
congratulate	+	0	0	0	+	-	-	0	+	-	+
oppose	-	0	+	0	-	0	+	0	-	+	0
evade	-	0	-	+	-	-	+	0	0	0	0
console	-	+	0	0	+	-	-	0	0	-	-
Feature VIII										?	
warn		0	0	0	0	0	-	0	+	+	0
promise		0	0	0	+	0	0	0	+	+	0
console		+	0	0	+	-	-	0	0	-	-
nurse		0	0	+	+	0	-	+	-	+	0
exalt		+	+	+	+	+	-	-	+	-	-
Feature IX								?		?	
inform	+	0	0	0	0	+	-	0	+	0	0

Table 7 (cont.)

Feature IX (cont.)	Feature Sign	A Moral / Immoral	B Potent / Impotent	C Active / Passive	D Associative / Dissociative	E Initiating / Reacting	F Ego- / Alter	G Supra / Sub	H Terminal / Interminal	I Future / Past	J Deliberate / Impulsive
apologize	+	+	-	0	+	-	0	-	+	-	+
congratulate	+	0	0	0	+	-	-	0	+	-	+
exalt	+	+	+	+	+	+	-	-	+	-	-
indulge	-	0	0	0	+	-	-	+	0	0	-
forgive	-	+	0	0	+	-	-	+	+	-	0
defend	-	+	+	0	+	0	-	0	-	+	0
oppose	-	0	+	0	-	0	+	0	-	+	0

dominant Associative/Dissociative one; appreciatively and considerately contrast with meanly, unfairly and despicably on this feature. If we close our eyes to the presence of Corrupt in Feature III, then it is clearly an Ego-oriented/Alter-oriented distinction -- and I suppose the coding of Corrupt as Alter-oriented is at least debatable; distinguishing AV's are selfishly and unfairly vs. considerately. Feature IV is equally sharply the Supraordinate/Subordinate distinction so important in interpersonal relations; the AV assignment is one-sided -- only reluctantly, guiltily and desperately (yet not submissively) being negatively coded. Feature V neatly taps the Moral/Immoral distinction, and this shows up in the adverbial sincerely/guiltily contrast as well; as expected, Morality parallels the dominant Associative/Dissociative feature, adding its moral tone, so to speak. Feature VI is an equally neat specification of the Deliberate/Impulsive aspect of interpersonal behavior, with submissively, guiltily and despicably (Deliberate) contrasting with excitedly and impulsively (Impulsive). Beyond this point, nothing is clear. Feature VIII is suggested as Future-oriented/Past-oriented by the adverbs coded + on it (there are no minus codings) -- hopefully, successfully, sincerely, considerately, desperately, but also guiltily -- but among the verbs shown in Table 7 only Warn, Promise, and Nurse have a priori Future codings.

What can be said of these tests of empirical discovery procedures? Both Factor and Feature Analyses yield clearly identifiable (in terms of my a priori codings) Associative/Dissociative, Supraordinate/Subordinate and Ego-oriented/Alter-oriented features, and

it may well be that these are the dominant ways that humans characterize interpersonal relations. Factor Analysis yields a Future/Past feature fused with one Ego/Alter factor; Feature Analysis yields pretty clear Moral/Immoral and Deliberate/Impulsive features as well as a fused Terminal-Dynamic/Interminal-Insipid kind of feature. Neither analysis yields the hypothesized Initiating/Reacting feature, and this may well be part of Osgoodian fantasy. Factor Analysis returns five reasonably clear a priori features; Feature Analysis returns perhaps six. In my opinion, the Feature Analysis yields generally cleaner features. Most of the factors obtained show complex fusions among features, and, if we didn't have a pretty good idea of what to look for from the a priori analysis, they would be hard to interpret. Of course, this is precisely what one would expect from the assumptions underlying the factor analytic approach as compared with the assumptions underlying the feature measurement model.

In general these results are encouraging. They suggest that, when a known set of semantic features generates the judgements of appositeness, permissiveness and anomaly entering the target matrix, either standard factor analysis or our new feature analysis can yield at least some of the original features. As to the failure of either method to yield all of my own a priori features, it must be kept in mind that some of my features may be illusions, that the features in any semantic domain are probably hierarchically ordered in significance (amount of "work" done), and that my own judgements of the 600 verb/adverb combinations are certainly fallible. But what about "ordinary" native speakers? Will identifiable semantic features--either those hypothesized or different ones--emerge when they perform in the IPV/AV task?

To obtain really ordinary native speakers of English we turned to the usual source, college sophomores taking Introductory Psychology at the University of Illinois and required to put in so many hours as subjects for experiments -- nothing derogatory is intended here! A somewhat modified set of 30 IPV's and an expanded set of 30 AV's were presented in all possible 900 combinations to 40 subjects[31] along with careful instructions and examples.[32] For each

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[31]I wish to thank Dr. Earle Davis for his help in administering this test and arranging for the dats summations. Because of the length of the task, four groups of 40 subjects each judged 225 times.

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[32]Since the instruction given subjects is particularly importent in research of this kind, I reproduce the exact instructions here as Appendix A.

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item we obtain a distribution of +, 0 and - judgements (apposite, permissible, anomalous), e.g., Nurse rashly (2, 15, 23), criticize unceasingly (29, 11, 0), manipulate considerately (5, 21, 14); although in general the modal subject judgements agreed with mine, there were some exceptions--for example, our subjects considered cooperate reluctantly to be apposite (merely permissible, I would say), contradict unceasingly to be apposite (I would say anomalous), help appreciatively to be apposite (anomalous, I would say), and so on. A single value for each item was obtained by the for:

$$\frac{\text{Apposite} - \text{Anomalous}}{\text{Apposite} + \text{Permissible} + \text{Anomalous}}$$

and either treated as a continuous variable (factor analyses) or assigned to one of three categories (feature analyses).

Table 8 presents the results of a factor analysis of the Illinois subject data using a Varimax rotation of the principal axis factors. Table 9 presents the results of a factor analysis of the same data using the Equimax rotation procedure. Since, as might be expected, there is considerable similarity between the

TABLES 8 AND 9 ABOUT HERE

two solutions, I shall discuss them in parallel. Factor I in both cases seems to reflect the dominant Associative/Dissociative feature; differentiating adverbs common to both analyses are considerately, kindly and sincerely versus despicably and unfairly. The second factors in both cases are hard to interpret, as far as the verbs are concerned, yet the factor loadings of the adverbs in both make it look like a Dynamism feature (combination of Potency with Activity) in the Varimax solution, emphatically, firmly, angrily, and rashly are opposed to appreciatively and warmly, while the Equimax solution rashly, angrily, emphatically, firmly and contemptuously are opposed to appreciatively, hopefully and warmly. Varimax III and Equimax IV appear to tap the Ego-oriented/Alter-oriented feature, although with somewhat different sets of verbs doing the work: efficiently, desperately, successfully and hopefully contrast with appropriately, generously, sincerely and, interestingly enough, unwillingly on Varimax while appropriately, appreciatively and considerately contrast with guiltily, desperately, and impulsively in the Equimax solution. Equimax III looks like a re-run of the Associative/Dissociative feature, but now with more clearly Moral/Immoral overtones; appropriately, sincerely and warmly are opposed to selfishly, contemptuously and unfairly. Varimax IV is uninterpretable. Varimax

Table 8

Illinois Subject and Osgood Features Compared; Varimax Solution of a 30 IPV/30 AV Matrix

	Factor Scores	A Moral Immoral	B Potent Impotent	C Active Passive	D Associative Dissociative	E Initiating Reacting	F Ego- Alter	G Supra Sub	H Terminal Interminal	I Future Past	J Deliberate Impulsive
Factor I		?			+						
congratulate	1.34	0	0	0	+	-	-	0	+	-	+
help	1.31	0	0	+	+	0	-	+	0	0	0
apologize	1.30	+	-	0	+	-	0	-	+	-	+
forgive	1.30	+	0	0	+	-	-	+	+	-	0
nurse	1.24	0	0	+	+	0	-	+	-	+	0
ridicule	-1.61	-	0	+	-	-	-	+	+	-	-
defy	-1.51	0	+	+	-	-	+	0	0	+	-
deceive	-1.34	-	-	-	-	0	0	0	0	0	+
corrupt	-1.31	-	0	0	-	+	-	+	-	+	+
repel	-1.29	0	+	+	-	-	+	0	+	0	0
Factor II			?								
learn from	2.17	0	0	0	0	0	+	-	0	+	+
console	1.44	+	0	0	+	-	-	0	0	-	-
corrupt	1.39	-	0	0	-	+	-	+	-	+	+
show respect for	1.22	0	0	-	+	0	-	-	0	-	-
nurse	1.09	0	0	+	+	0	-	+	-	+	0
forgive	1.00	+	0	0	+	-	-	+	+	-	0
oppose	-1.86	0	+	0	-	0	+	0	-	+	0
criticize	-1.55	0	0	+	-	-	-	+	+	-	+
cooperate	-1.43	0	0	0	+	0	0	0	+	0	+
disregard	-1.17	0	0	-	-	-	0	0	-	0	+
warn	-1.16	0	0	0	0	0	-	0	+	+	0
repel	-1.07	0	+	+	-	-	+	0	+	0	0
Factor III				?			*			?	
congratulate	2.20	0	0	0	+	-	-	0	+	-	+
concede to	2.07	0	-	-	+	-	-	-	+	-	+
show respect for	2.05	0	0	-	+	0	-	-	0	-	-
forgive	1.83	+	0	0	+	-	-	+	+	-	0
compete with	-1.47	0	+	0	0	0	+	0	-	+	0
manipulate	-1.32	0	0	+	0	+	+	+	0	+	+
repel	-1.23	0	+	+	-	-	+	0	+	0	0

Table 8 (cont.)

	Factor Scores	A Moral Immoral	B Potent Impotent	C Active Passive	D Associative Dissociative	E Initiating Reacting	F Ego- Alter	G Supra Sub	H Terminal Interminal	I Future Past	J Deliberate Impulsive
Factor III (cont.)											
plead with	-1.05	0	0	0	0	+	+	-	0	+	0
Factor IV							?				
show respect for	2.01	0	0	-	+	0	-	-	0	-	-
learn from	1.82	0	0	0	0	0	+	-	0	+	+
congratulate	1.47	0	0	0	+	-	-	0	+	-	+
console	1.35	+	0	0	+	-	-	0	0	-	-
nurse	1.26	0	0	+	+	0	-	+	-	+	0
plead with	-1.77	0	0	0	0	+	+	-	0	+	0
seduce	-1.60	-	0	0	0	+	+	+	-	+	+
defy	-1.53	0	+	+	-	-	+	0	0	+	-
apologize	-1.08	+	-	0	+	-	0	-	+	-	+
Factor V								*			
apologize	1.91	+	-	0	+	-	0	-	+	-	+
cooperate	1.48	0	0	0	+	0	0	0	+	0	+
inform	1.41	0	0	0	0	+	-	0	+	0	0
concede to	1.25	0	-	-	+	-	-	-	+	-	+
corrupt	-1.72	-	0	0	-	+	-	+	-	+	+
ridicule	-1.63	-	0	+	-	-	-	+	+	-	-
seduce	-1.62	-	0	0	0	+	+	+	-	+	+
deceive	-1.37	-	-	-	-	0	0	0	0	0	+
Factor VI										*	
oppose	1.64	0	+	0	-	0	+	0	-	+	0
deceive	1.42	-	-	-	-	0	0	0	0	0	+
defy	1.26	0	+	+	-	-	+	0	0	+	-
hinder	1.13	0	0	0	-	+	-	0	+	+	0
congratulate	-2.28	0	0	0	+	-	-	0	+	-	+
forgive	-1.72	+	0	0	+	-	-	+	+	-	0
show respect for	-1.47	0	0	-	+	0	-	-	0	-	-

Table 8 (cont.)

		A	B	C	D	E	F	G	H	I	J
	Factor Scores	Moral Immoral	Potent Impotent	Active Passive	Associative Dissociative	Initiating Reacting	Ego- Alter	Supra Sub	Terminal Interminal	Future Past	Deliberate Impulsive
Factor VII			?								*
concede to	1.96	0	-	-	+	-	-	-	+	-	+
learn from	..51	0	0	0	0	0	+	-	0	+	+
seduce	1.44	-	0	0	0	+	+	+	-	+	+
oppose	-1.61	0	+	0	-	0	+	0	-	+	0
compete	-1.61	0	+	0	0	0	+	0	-	+	0
plead with	-1.54	0	0	0	0	+	+	-	0	+	0

Table 9

Illinois Subject and Osgood Features Compared;
Equimax Solution of a 30 IPV/30 AV Matrix

		A	B	C	D	E	F	G	H	I	J
	Factor Scores	Moral Immoral	Potent Impotent	Active Passive	Associative Dissociative	Initiating Reacting	Ego-Alter	Supra Sub	Terminal Interminal	Future Past	Deliberate Impulsive
Factor I		?			*				?		
ridicule	1.70	-	0	+	-	-	-	+	+	-	-
corrupt	1.66	-	0	0	-	+	-	+	-	+	+
seduce	1.53	-	0	0	0	+	+	+	-	+	+
deceive	1.35	-	-	-	-	0	0	0	0	0	+
defy	1.35	0	+	+	-	-	+	0	0	+	-
apologize	-1.87	+	-	0	+	-	0	-	+	-	+
cooperate	-1.51	0	0	0		0	0	0	+	0	+
inform	-1.33	0	0	0	0	+	-	0	+	0	0
help	-1.32	0	0	+	+	0	-	+	0	0	0
Factor II		?	?		*						
console	1.59	+	0	0	+	-	-	0	0	-	-
nurse	1.47	0	0	+	+	0	-	+	-	+	0
learn from	1.45	0	0	0	0	0	+	-	0	+	+
forgive	1.37	+	0	0	+	-	-	+	+	-	0
oppose	-1.73	0	+	0	-	0	+	0	-	+	0
defy	-1.56	0	+	+	-	-	+	0	0	+	-
criticize	-1.48	0	0	+	-	-	-	+	+	-	+
contradict	-1.46	0	0	0	-	-	0	+	+	-	+
Factor III		?			*	?					
corrupt	1.63	-	0	0	-	+	-	+	-	+	+
deceive	1.63	-	-	-	-	0	0	0	0	0	+
ridicule	1.49	-	0	+	-	-	-	+	+	-	-
hinder	1.40	0	0	0	-	+	-	0	+	+	0
congratulate	-1.64	0	0	0	+	-	-	0	+	-	+
apologize	-1.44	+	-	0	+	-	0	-	+	-	+
forgive	-1.35	+	0	0	+	-	-	+	+	-	0
help	-1.20	0	0	+	+	0	-	+	0	0	0

Table 9 (cont.)

	Factor Scores	A Moral Immoral	B Potent Impotent	C Active Passive	D Associative Dissociative	E Initiating Reacting	F Ego-Alter	G Supra Sub	H Terminal Interminal	I Future Past	J Deliberate Impulsive
Factor IV							*				
show respect for	2.07	0	0	-	+	0	-	-	0	-	-
learn from	1.81	0	0	0	0	0	+	-	0	+	+
congratulate	1.67	0	0	0	+	-	-	0	+	-	+
console	1.60	+	0	0	+	-	-	0	0	-	-
nurse	1.52	0	0	+	+	0	-	+	-	+	0
defy	-1.87	0	+	+	-	-	+	0	0	+	-
oppose	-1.45	0	+	0	-	0	+	0	-	+	0
plead with	-1.33	0	0	0	0	+	+	-	0	+	0
seduce	-1.28	-	0	0	0	+	+	+	-	+	+
Factor V							*			*	
repel	1.38	0	+	+	-	-	+	0	+	0	0
compete	1.36	0	+	0	0	0	+	0	-	+	0
defy	1.22	0	+	+	-	-	+	0	0	+	-
manipulate	1.17	0	0	+	0	+	+	+	0	+	+
congratulate	-2.20	0	0	0	+	-	-	0	+	-	+
show respect for	-1.98	0	0	-	+	0	-	-	0	-	-
concede to	-1.90	0	-	-	+	-	-	-	+	-	+
forgive	-1.88	+	0	0	+	-	-	+	+	-	0
Factor VI					*						
help	1.47	0	0	+	+	0	-	+	0	0	0
apologize	1.35	+	-	0	+	-	0	-	+	-	+
cooperate	1.33	0	0	0	+	0	0	0	+	0	+
nurse	1.20	0	0	+	+	0	-	+	-	+	0
ridicule	-1.63	-	0	+	-	-	-	+	+	-	-
corrupt	-1.50	-	0	0	-	+	-	+	-	+	+
defy	-1.44	0	+	+	-	-	+	0	0	+	-
deceive	-1.36	-	-	-	-	0	0	0	0	0	+

Table 9 (cont.)

		A	B	C	D	E	F	G	H	I	J
	Factor Scores	Moral Immoral	Potent Impotent	Active Passive	Associative Dissociative	Initiating Reacting	Ego- Alter	Supra Sub	Terminal Interminal	Future Past	Deliberate Impulsive
Factor VII								?			
learn from	1.84	0	0	0	0	0	+	-	0	+	+
corrupt	1.60	-	0	0	-	+	-	+	-	+	+
seduce	1.44	-	0	0	0	+	+	+	-	+	+
oppose	-1.58	0	+	0	-	0	+	0	-	+	0
plead with	-1.39	0	0	0	0	+	+	-	0	+	0
deceive	-1.39	-	-	-	-	0	0	0	0	0	+
concede	-1.38	0	-	-	+	-	-	-	+	-	+

V is a reasonably clear Supraordinate/Subordinate feature, with unwillingly, submissively, reluctantly and timidly defining the negative pole (no clear positive adverbs); Equimax VII may be a muddy version of the same feature, but here it is unceasingly, resolutely and emphatically (positive) versus submissively and guiltily (weakly negative). Varimax VI appears to be the Future-oriented/Past-oriented feature, yet it is adverbs of Varimax VII which display this feature (hopefully, resolutely, and excitedly vs. contemptuously and guiltily). It is Equimax V which combines this Future/Past feature with another version of Ego/Alter; the adverbs having high loadings on Equimax V are successfully, efficiently, desperately and hopefully, so a better inference might be a kind of Striving feature. Finally, Varimax VII may be a reflection of the Deliberate/Impulsive feature, but again there is no confirmation in the adverb loadings.

How did the discrete and absolute Feature Analysis method fare with data from ordinary native speakers? The answer, in a nutshell, is miserably. Not only did no identifiable features appear, but it was obvious that the program was not working--for some reason, it was the adverbs which were being assigned values and nearly all of the verbs on each feature which were being turned back to zero. Various adjustments were made--in the cut-off points for assigning +1, 0 and -1 to combinations in the target matrix, in the number of unpatchable errors to be tolerated, and so on - but nothing came of it. It was also at about this time we were becoming disenchanted, for other reasons, with the discrete theoretical model and measurement procedure. Working at Illinois with the intersection

of emotion nouns and modifying adjectives, it was becoming clear that factor analysis, with its continuous theoretical assumptions, did a consistently better job than feature analysis. And a colleague in mathematics demonstrated conclusively that, given the number of features we were working with and their possible combinations, the number of alternative solutions of the same target matrix was--if not infinite--very large.[33]

[33]We wish to thank Dr. Klaus Witz for the interest he has shown in our work and for the time he has put into trying to help us solve this problem.

The coup de grace, empirically, for the feature analysis method was delivered by Dr. Marilyn Wilkins. Using my own a priori code-strips for 40 emotion nouns and 30 adjectives, she generated that specific target matrix which had to be consistent with these specific features and their codings, following the discrete theory described earlier. In other words, we knew that here a unique and "correct" solution was possible. A feature analysis run through 11 iterations, to equal the number of hypothesized features, accounted for 81% of the target matrix, but the features themselves clearly did not match the a priori ones--the basic affective ones (dominant in this domain) were there, a couple of the others and a couple of novel but interpretable ones, but the remainder were meaningless. It appears that our friend in mathematics was right.

We are left with something of a paradox. How are we to explain the fact that, when applied to my own target matrix (but

judged combinations, not generated from a priori features) for the 30 IPV/20 AV intersection, the Feature Analysis method did just as well as, and perhaps a bit better than, the Factor Analysis method (cf., Tables 6 and 7)? This may have just been coincidence, of course, the feature program yielding one of many alternative solutions that happened to match the a priori one. Or the difficulty may lie in the looseness of the procedure whereby the program determines the IPV and AV pivots to be used in assigning codings for trial features.[34] We have sometimes noted that the

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[34]Perhaps the neatest results to date have been obtained by Marilyn Wilkins using a combination of factor and feature methods -- factor analysis at the beginning of each cycle to select pivots and feature analysis to assign trial codings, make predictions of combinations, and finally produce a residual matrix for the next cycle. However, this rather laborious procedure was used with the noun/adjective intersection and will be reported separately.

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verbs assigned to a given computed feature appear to reflect a different a priori feature than the adverbs assigned to it.

By way of summarizing the results obtained with these empirical discovery procedures, we may note, first, that there is reasonable consistency across testings in terms of which a priori features are "discovered" and which are not. Omitting the feature analysis of the Illinois subject data, which yielded nothing interpretable, we find that Associative/Dissociative, Supraordinate/Subordinate and Ego-

oriented/Alter-oriented features come through clearly in all tests -- suggesting that these characteristics of interpersonal behavior are most sharply represented in the semantics of interpersonal verbs. Moral/Immoral, Future/Past, Deliberate/Impulsive and some fusion of Potent-Active/Impotent-Passive (which I have called Dynamism) appear occasionally and less clearly. Initiating/Reacting and Terminal/Interminal never appear clearly and independently. It looks as if ordinary native speakers, when presented with interpersonal verb/adverb combinations, react primarily in terms of those features which are most salient to them in the given semantic domain. From the point of view of a performance model, this is not surprising. If, however, one wishes to determine the semantic competence of speakers, these procedures leave much to be desired.

Psycholinguistic Reality of A Priori Semantic Features

In the preceding section we were concerned with feature and factor analysis techniques as empirical discovery procedures. We asked this hypothetical question: if we knew nothing about the semantic features operating within a given domain, or in a foreign language, could we rely upon either or both of these procedures to "blindly" discover them? The answer here -- as to most scientific questions -- was both "yes" (for the most salient features) and "no" (for less salient features). Certainly these empirical procedures are not as precise, as close to the limits of semantic competence, as the intuitions of sophisticated native speakers. Now we want to ask a different question: do our a priori features "predict" the behaviors of people when they are using interpersonal verbs? In the usual language of experimental psychology, are these feature of inter-

personal verbs valid? We shall ask several specific questions: (1) Can any one of the many possible rotations of empirical subjects' data be shown to correspond to the a priori model? (2) If you instruct native speakers to differentiate interpersonal verbs in terms of the a priori features, can they do so? (3) Do the spontaneous sortings of interpersonal verbs correspond to the a priori features? (4) Can you experimentally manipulate the availability of different features in relevant linguistic performance tasks?

A Procrustian Bed

In Australia, Kenneth Forster was asking himself similar questions. He turned to a technique developed by Raymond Cattell (Hurley and Cattell, 1962), called PROCRUSTES, which takes the unrotated factor matrix and determines that rotation which will maximally fit any given hypothesis about the "true" factors operating in the domain. If the hypothesis is nonsense, and the data are sense, then no solution (except by chance) will be obtained; but if the hypothesis is sense, and the data are in any way amenable, then PROCRUSTES will find the optimum correspondence. Note that this is not a discovery procedure. It is, rather, a procedure for evaluating the adequacy of intuited features. What one does is to postulate a set of adverbs (in this case) which should have high positive (+.50) or high negative (-.50) loadings on the a priori features and then turn PROCRUSTES loose to make the best fit from the empirical data. If the computer program yields patterns which

are compellingly different from the a priori assumptions, then one may change his a priori codings.

Table 10 presents such an analysis of hypothesized features (Osgood, a priori codings) and PROCRUSTES obtained matches, H and P respectively, for the Illinois subject data. Since, at the time this analysis was done, we only had a priori codings for 20 adverbs.

TABLE 10 ABOUT HERE

(and the Illinois subject data involved 30 adverbs, including some changes), PROCRUSTES sometimes "suggested" new adverbs that should be coded on the features -- these cases appear as values under P without corresponding predicted values under H. It can be seen that an "optimal" rotation matches the Associative/Dissociative, Supra-ordinate/Subordinate and Ego-oriented/Alter-oriented features rather well, the Moral/Immoral, Potency-Activity/Impotency-Passivity, Future/Past and Deliberate/Impulsive features fairly well and the Initiating/Reacting and Terminal/Interminal feature poorly if at all. This is entirely consistent with what we found with the discovery procedures. In other words, the PROCRUSTES program faithfully represents semantic features in ratio to their salience to ordinary native speakers. The "additions" PROCRUSTES makes to our a priori features are of some interest: for ordinary native speakers, rashly is somewhat Immoral, appropriately and resolutely are somewhat Potent, impulsively is Active, generously and warmly are Associative and rashly Dissociative, efficiently is Initiating, appropriately is Alter-oriented, ef-

TABLE 10

Hypothesized a priori Factor Loadings (H) for Adverbs and Optimum Procrustes Match (P) for Illinois Subject Data

	A		B		C		D		E		F		G		H		I		J	
FEATURES	Moral		Potent		Acti		Associative		Initiating		Ego		Supra		Future		Terminal		Deliberate	
	Immoral		Impotent		Passiv		Dissociative		Reacting		Alter		Sub		Past		Interminal		Impulsive	
Adverbs	H	P	H	P	H	P	H	P	H	P	H	P	H	P	H	P	H	P	H	P
1. angrily			50	26	50	27	-50	-64												
2. appreciatively							50	56	-50	-23										
3. appropriately				35								-45								
4. considerately	50	28					50	39			-50	-28								
5. contemptuously	-50	-26					-50	-35												
6. desperately					50	41				35	50	46	-50	-22	50	44				
7. despicably	-50	-29					-50	-69												
8. drastically			50	28			-50	-49									50	13		
9. efficiently										56						60				
10. emphatically			50	35	50	45											50	39		
11. excitedly					50	56											50	17	-50	-53
12. firmly			50	60									50	40					50	17
13. generously								58												
14. guiltily			-50	-50									-50	-64						
15. hopefully															50	63	-50	-42		
16. impulsively						49													-50	-50
17. kindly							50	50												
18. quietly																				
19. rashly		-36						-57												-22
20. reluctantly													-50	-34					50	00
21. resolutely				36																
22. selfishly	-50	-52									50	57								
23. sincerely	50	37						38												

TABLE 10 (cont.)

	FEATURES	A Moral / Immoral		B Potent / Impotent		C Active / Passive		D Associative / Dissociative		E Initiating / Reacting		F Ego / Alter		G Supra / Sub		H Future / Past		I Terminal / Interminal		J Deliberate / Impulsive	
	Adverbs	H	P	H	P	H	P	H	P	H	P	H	P	H	P	H	P	H	P	H	P
24.	submissively			-50	-51									-50	-53						
25.	successfully									50	66					50	68				
26.	timidly			-50	-19																
27.	unceasingly																	-50	-23		
28.	unfairly	-50	-51					-50	-46												-36
29.	unwillingly																				
30.	warmly								57												

ficiently and desperately are future-oriented, and unfairly seems to be somewhat Impulsive. This analysis indicates that ordinary speaker judgements are by no means inconsistent with intuited semantic features.

A Semantic Word Game

While in Hawaii we devised a rather unusual sorting method for validating the a priori semantic features. We used the "target" display, familiar to British pub habituees, with a randomly determined interpersonal verb in the center of a series of expanding rings, twelve in number. Subjects were given a set of 39 (one minus the number of IPV's) "dog-tags" on each of which was printed an interpersonal verb, e.g., ANNOY, CONCEDE TO, DEFY, ENCOURAGE, IMITATE, PLEASE, RIDICULE, THREATEN, etc. Using a color-chip analogy, the subjects were instructed to arrange all of the verbs into strings, either passing through the center verb (bi-polar) or at least originating at the origin (mono-polar).[35] These subjects were allowed unlimited time to construct 10 "solutions",

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[35]Danny Steinberg, now at the Center for Comparative Psycholinguisti collected the data, for which my thanks. It should be noted that both the author (CEO) and his daughter (GRO) were among the 18 subjects.

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each with a different randomaly assigned IPV as the "target." They were not given any cues as to the a priori features presumed to be operating. The question was: would the distribution of IPV's correspond to the a priori features?

Back at Illinois, Marilyn Wilkins and Caralee Beasley[36] devised statistical procedures for testing the correspondence

[36]Miss Beasley was an NSF undergraduate fellow in the summer of 1965-66; she was responsible for the analysis, under Dr. Wilkins' direction.

between native-speaker assignments in the game and a priori features. A combination of Binomial and Runs Tests was employed: if there were five or more words in a string either all + or all - on a given feature, that feature was considered to be "identified"; if 7 or more words in a string were coded + or -, and there were two runs (two changes in sign, + to 0 to -, in the string with respect to a feature), that feature was considered to be "identified"; and so on for longer strings, either mono-polar or bipolar in nature. In other words, this was a test of the significance of the correspondence of native-speaker organizations of IPV's to the predictions of the a priori features, in a situation where multi-dimensionality of the materials is explicitly recongized (unlike the usual categorizing procedures).

Table 11 gives the frequencies of such statistically significant "identifications" of features. It will be noted that Features D (Associative/Dissociative), G (Supraordinate/Subordinate)

TABLE 11 ABOUT HERE

F (Ego-oriented/Alter-oriented) have the highest frequencies of identification; this is again consistent with the features "discovere

TABLE 11

Frequencies of Significant Identifications of A Priori IPV Features in Sortings of 18 Subjects Playing 10 Games Each

FEATURES	LABELS	N IDENTIFICATIONS
A	Moral/Immoral	61
B	Potent/Impotent	71
C	Active/Passive	44
D	Associative/Dissociative	454*
E	Initiating/Reacting	34
F	Ego-oriented/Alter-oriented	110
G	Supraordinate/Subordinate	236*
H	Future-oriented/Past-oriented	66
I	Terminal/Interminal	9
J	Deliberate/Impulsive	62

* The frequencies for D and G are larger than the total number of games (180) because these features appeared in two or three strings in many games, fused with various other features.

in factor and feature analyses. It will also be noted that Features E (Initiating/Reacting), C (Active/Passive) and I (Terminal/Interminal) are the least frequently "identified", again consistent with discovery-procedure results. What features tend to be linked together in the sortings of subjects? Table 12 gives the percentage overlaps of the less frequently identified features with the more frequently identified

TABLE 12 ABOUT HERE

features in the "word game" strings. E is dependent on H and somewhat on J (Initiating on Future-orientation and Deliberateness); A is dependent on F, G, D and H (Moral on Alter-oriented, Subordinateness, Associativeness and Past-oriented); J is somewhat dependent on G (Deliberateness upon Supraordinateness); B goes with G and D (Potency with Supraordinateness and Dissociativeness); H occurs with F and G (Future-orientation with Ego-orientation and Supraordinateness); F depends on both G and D (Ego on Supraordinate and Dissociative); and G is highly contingent on D (Supraordination on Dissociation). All of these contingencies seem reasonable in human relations.

Inspection of these data indicated that it was not contingencies among the a priori codings, as determined from feature intercorrelations across all verb code-strips, that was responsible for these overlappings of features in strings. It was something "in the subjects' heads", so to speak. Furthermore, distances computed from the code-strips of the verbs correlated well with the "distances" computed from closeness of verbs within strings and separation of verbs onto different strings in the game -- at least at the extremes. In other words, IPV's having highly similar a priori code-strips tended to be placed close together on the same string while IPV's having very dissimilar codings tended to be either toward the extremes of the same strings or, more often on separate strings. In sum, the data from the semantic sorting game validate most of the a priori features

TABLE 12

Conditional Probabilities of Secondary Features in Same Strings Given Identification of Primary Features*

FEATURES**

	D	G	F	H	B	J	A	E	C	I	
D	-	24	16	9	11	5	13	4	6	1	Associative Dissociativ
G		-	21	14	14	11	14	8	9	2	Supraordina Subordinate
F			-	18	1	3	21	4	5	1	Ego-oriente Alter-orien
H				-	0	2	11	27	3	2	Future-orie Past-orient
B					-	3	3	0	4	0	Potent Impotent
J						-	5	11	0	0	Deliberate Impulsive
A							-	5	6	0	Moral Immoral
Eq								-	3	0	Initiating Reacting
C									-	0	Active Passive
I										-	Terminal Interminal

* By "primary" feature in each pairing we mean that feature identified most often in the total data. Thus D was identified more often in strings than G, and of all the times that D was identified G was also identifiable in 24% of the same strings.

** Features are ordered from D to I in terms of primacy (cf., Table 11).

of interpersonal verbs and the findings of the two discovery procedures.

Small Group Dynamics and a Feature Scaling Test

One of the problems in small group dynamics studies, as I understand it,[37] is that the tests used to determine the cognitive

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[37]Primarily from discussions with Professor Fred Fiedler, whose interest in and support of this direction of research we gratefully acknowledge.

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similarities and differences among members of groups seldom if ever bear any direct relation to the tasks used to measure group performance. Judith Ayer and the author had the idea that the IPV/AV intersection test would provide a good measure of semantic (cognitive) similarities among people, later to be assigned to small groups, and that the semantic word game, described above, would serve as a directly related task for small group solution.

Accordingly, 45 native English speakers -- this time including about half drawn from the Introductory Psychology "pool" and half from honors students in English -- were selected to serve in a series of integrated tasks: (1) A new set of 40 interpersonal verbs was drawn from our supply with a priori codings in such a way as to give balanced representation to all ten features in all coding possibilities (+, 0, —); these verbs were given to the subjects as stimuli, to which they were to associate appropriate adverbs, and the most "fitting" AV for each IPV was selected. (2) Removal of near-synonymous AV's left 30, and these were combined with all IPV's in

the usual IPV/AV intersection procedure for judgments of appositeness, permissiveness and anomaly by the same subjects. (3) Using the results of a factor analysis, with subjects correlated with each other across the strung-out 1200 IPV/AV items, the subjects were assigned to three types of three-person groups in terms of their factor loadings -- maximally Similar, Odd-man-out (two similars, one very different from them), and maximally Dissimil. in their usages of interpersonal verbs and modifying adverbs. (4) Each three-person group played the "same" semantic word game, with the verb Confuse in the center of the target, and their task was to arrive at a group solution in distributing the other 39 IPV's on the target. (5) There was, finally, a scaling post-test of all 40 verbs, to be used as a criterion in evaluating the "success" of various groups in the game.

Each group game was tape recorded, along with a running sub voce commentary by Mrs. Ayer, and a carefully marked target representing each solution was obtained (directly on the large paper target onto which verbs were pinned in the course of the game). Brief commentary on this small group task is in order.[38] In the

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[38] A detailed analysis of the group game data, in relation to various performance criteria, is now in process and will be reported separate by Mrs. Ayer.

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first place, there is no question but that the semantic word game is a highly motivating group task. Subjects soon become involved in

animated arguments about the meanings of words and about the nature of interpersonal behavior generally. Preliminary inspection of the data suggests that, whereas Similar groups tend to argue about the fine details of allocation to the target (e.g., whether Seduce belongs right on the line with Bully and Molest or better slightly separated), Odd-man-out groups tend to disagree on more basic matters (e.g., is one who Seduces in any way dominant in the sense that one who Bullies is), and it is typically the Odd Man (as determined by the IPV/AV pre-test) who is on one end of the arguments. Although Similar teams usually take the shortest times to achieve a solution, inspection of the data suggests that the richest, most semantically refined solutions come from the maximally Dissimilar groups -- as if their cognitive differences force the use of more subtle features to achieve mutual satisfaction. It is also clear that solutions differ in the degree to which the strings produced can be matched to a priori features, as determined by the subjects' own post-test scaling, and this provides as intimately relevant criterion of performance in the group task.

Our present interest, however, is in the post-test. This was a scaling task, using semantic differential format but with the ten 7-step scales defined by the ten a priori features themselves (e.g., Deliberate-Impulsive, Moral-Immoral, Initiating-Reacting, etc.), with each of the 40 interpersonal verbs to be rated by each subject on each feature-scale. Very careful instructions, definitions and examples of each semantic feature were provided. The question here is this: if "ordinary" native speakers are given a priori features explicitly, can they use them to differentiate the meanings of words consistently and in agreement with a priori "expert" codings? Our

first answer comes from a factor analysis of these scaling data. As shown in Table 13, several features appear clearly and independently

TABLE 13 ABOUT HERE

Ego/Alter (Factor III), Supraordinate/Subordinate (Factor IV), Future/Past (Factor VIII) and, interestingly enough, for the first time Initiating/Reacting (Factor VII). Potency and Activity again fuse into what we have called Dynamism (Factor II). The dominant Associative/Dissociative feature appears as Factor I, but it is fused with Moral/Immoral, Impulsive/Deliberate, and, particularly, a version of Reacting Initiating -- in other words, in our subjects' semantics Associative behaviors tend to be Moral, Impulsive and Reactive, and conversely for Dissociative behaviors. Factors V and VI are not clear, the former apparently being some fusion of Terminal-Past-Associative features and the latter some fusion of Supraordinate-Past-Dissociative features.

More impressive were contingency analyses of the relations between a priori and subject scalings. Where the distributions of subject mean judgments into plus 3 and plus 2 on the scale(coded +), plus 1, zero and minus 1 (coded 0), and minus 3 and minus 2 (coded -) were sufficiently balanced, these absolute judgments were used for contingency analyses; where they were highly skewed, the subjects' ratings were divided into upper, middle and lower thirds. Table 14 summarizes these analyses, reporting numbers of words in corresponding

TABLE 14 ABOUT HERE

cells (perfect agreements in direction of coding), numbers of words in diametrically opposed cells (a priori one sign, subjects opposed

TABLE 13

Factor Analysis of Feature Scaling Data

Factor I	loading	A Moral Immoral ?	B Potent Impotent	C Active Passive	D Associative Dissociative *	E Initiating Reacting *	F Ego Alter	G Supra Sub	H Terminal Interminal	I Future Past	J Delibe Impuls ?
molest	.82	-	+	+	-	+	0	+	0	0	0
ambush	.81	-	0	0	-	+	+	0	+	0	+
betray	.75	-	0	0	-	+	0	0	+	-	+
cheat	.74	-	0	0	-	+	+	0	0	0	+
seduce	.64	-	0	0	0	+	+	+	0	+	+
bully	.62	-	+	+	-	+	0	+	0	0	0
embarrass	.60	0	0	0	-	+	-	+	0	-	0
reassure	-.25	0	+	0	+	-	-	+	+	-	0
accept	-.25	0	0	-	+	-	0	0	0	0	0
console	-.23	+	0	0	+	-	-	0	0	-	-
share with	-.25	0	0	0	+	0	0	0	-	0	0
Factor II			*	*	?						
resist	.82	0	0	0	-	-	+	0	-	+	0
defy	.71	0	+	+	-	-	+	0	0	+	-
compete with	.67	0	0	+	0	0	+	0	-	+	0
hold contempt for	.64	0	+	0	0	-	-	+	-	-	0
spurn	.58	0	+	+	-	-	0	+	+	0	-
refute	.56	0	+	0	-	-	0	+	+	-	0
share with	-.16	0	0	0	+	0	0	0	-	0	0
confide in	-.16	0	-	0	+	+	+	0	+	-	0
be submissive	-.14	0	-	-	0	-	-	-	-	0	0

TABLE 13 (cont.)

Factor III	loading	A Moral / Immoral	B Potent / Impotent	C Active / Passive	D Associative / Dissociative	E Initiating / Reacting	F Ego / Alter *	G Supra / Sub	H Terminal / Interminal	I Future / Past	J Deliberat / Impulsive
advise	.79	0	0	0	0	+	-	0	0	+	+
console	.71	+	0	0	+	-	-	0	0	-	-
reform	.70	+	0	0	0	+	-	+	0	0	+
reassure	.70	0	+	0	+	-	-	+	+	-	0
convert	.64	0	0	0	0	+	-	+	+	+	0
train	.62	0	0	0	0	+	-	+	-	+	+
share with	.60	0	0	0	+	0	0	0	-	0	0
cheat	-.24	-	0	0	-	+	+	0	0	0	+
confess to	-.17	+	0	0	0	0	0	-	+	-	0
evade	-.14	0	-	+	-	-	+	0	0	0	0
Factor IV			?					*			
pay attention to	.71	0	0	0	0	-	0	0	0	0	+
be submissive	.69	0	-	-	0	-	-	-	-	0	0
obey	.59	0	-	0	0	-	0	-	0	0	0
serve	.53	0	0	0	+	0	-	-	0	0	0
evade	.50	0	-	+	-	-	+	0	0	0	0
plead with	.36	0	0	0	0	+	+	-	0	+	0
bully	-.32	-	+	+	-	+	0	+	0	0	0
seduce	-.31	-	0	0	0	+	+	+	0	+	+
embarrass	-.24	0	0	0	-	+	-	+	0	-	0
distress	-.21	0	0	0	-	+	-	0	0	0	0
spurn	-.21	0	+	+	-	-	0	+	+	0	-

TABLE 13 (cont.)

Factor V	loading	A Moral / Immoral	B Potent / Impotent	C Active / Passive	D Associative / Dissociative	E Initiating / Reacting	F Ego / Alter	G Supra / Sub	H Terminal / Interminal	I Future / Past	J Deliberate / Impulsive
					?					?	
confess to	.77	+	0	0	0	0	0	-	+	-	0
confide in	.67	0	-	0	+	+	+	0	+	-	0
accept	.52	0	0	-	+	-	0	0	0	0	0
console	.39	+	0	0	+	-	-	0	0	-	-
share with	.35	0	0	0	+	0	0	0	-	0	0
reform	-.28	+	0	0	0	+	-	+	0	0	+
train	-.33	0	0	0	0	+	-	+	-	+	+
harrass	-.27	-	+	+	-	+	-	0	-	0	0
bully	-.23	-	+	+	-	+	0	+	0	0	0
convert	-.21	0	0	0	0	+	-	+	+	+	0
Factor VI					?			?		?	
disregard	.64	0	0	-	-	-	0	0	-	0	+
exclude	.40	0	0	-	-	0	0	+	0	0	0
hold contempt for	.30	0	+	0	0	-	-	+	-	-	0
depreciate	.26	0	0	0	-	0	0	+	0	-	+
plead with	-.60	0	0	0	0	+	+	-	0	+	0
serve	-.50	0	0	0	+	0	-	-	0	0	0
court	-.31	0	0	+	+	+	+	0	-	+	0
obey	-.25	0	-	0	0	-	0	-	0	0	0

TABLE 13 (cont.)

Factor VII	loading	A Moral Immoral	B Potent Impotent	C Active Passive	D Associative Dissociative	E Initiating Reacting	F Ego Alter	G Supra Sub	H Terminal Interminal	I Future Past	J Deliberat Impulsive
						*					
confuse	.77	0	0	0	0	+	-	0	0	0	0
distress	.57	0	0	0	-	+	-	0	0	0	0
embarrass	.41	0	0	0	-	+	-	+	0	-	0
depreciate	.41	0	0	0	-	0	0	+	0	-	+
appease	-.32	0	-	-	+	-	0	0	0	0	0
refute	-.25	0	+	0	-	-	0	+	+	-	0
serve	-.18	0	0	0	+	0	-	-	0	0	0
Factor VIII					?					*	
court	.67	0	0	+	+	+	+	0	-	+	0
promise	.60	0	0	0	+	0	0	0	+	+	0
seduce	.38	-	0	0	0	+	+	+	0	+	+
refute	-.42	0	+	0	-	-	0	+	+	-	0
argue with	-.33	0	0	+	-	0	0	0	0	0	0
depreciate	-.24	0	0	0	-	0	0	+	0	-	+

TABLE 14

Significance Tests for Contingency Tables Relating

A Priori Codings to Subject Feature Scaling

FEATURE	WORDS IN + + and - - CELLS	WORDS IN + - and - + CELLS	SIGNIFICANCE LI
Moral/Immoral	10	0	*
Potent/Impotent	10	0	.05
Active/Passive	11	0	*
Associative/Dissociative	24	0	.001
Initiating/Reacting	22	0	.001
Ego/Alter Orientation	21	0	.001
Supraordinate/Subordinate	22	1	.001
Terminal/Interminal	14	0	.05
Future/Past Orientation	16	0	.001
Deliberate/Impulsive	14	3	.30 (ns.,

* Coefficients not computed because a priori codings too skewed for legitimate test.

sign), and significance levels. The features on which we would expect agreement, Associative/Dissociative, Ego/Alter, and Supra-ordinate/Subordinate, show it at the .001 level (i.e., one chance in a thousand of such agreement occurring by chance); but now to this group are added Initiating/Reacting and Future/Past. Two features reach only the .05 level of significance, Potent/Impotent and Terminal/Interminal, and one feature clearly does not show significant relation between a priori and subject coding -- Deliberate/Impulsive. It should be noted that, with the exception of Deliberate/Impulsive, radical disagreements in a priori and subject codings almost never occur; there is only one exception, on Supraordinate/Subordinate -- Defy is considered Subordinate by the author but Supracrdinate by the subjects, and I still think I'm right!

This highly significant correspondence between a priori codings and subject scalings may, at first blush, seem rather trivial -- since, after all, we told them what the features were and gave them good examples. If these semantic features were explicitly tagged in word-forms (like the singular vs. plural of nouns), then, of course, this would be trivial. But such is not the case. Something about the meaning of the interpersonal verbs must be operating. If these interpersonal verb word-forms produced no semantic reactions, differentiating them in ways corresponding to the a priori features, then no amount of instruction and example would enable native speakers to make such fine and agreed upon distinctions -- e.g., if, for example, we asked them to apply a feature such as "being closer to or further from Paris than Boston." As for Deliberate/Impulsive, either IPV's

are not coded discriminatively in such terms or our instructions and examples were inadequate. We take these results in general, then, as strong evidence for the psycholinguistic reality of most of the a priori features or close correlates of them.

Satiation of Semantic Features

Semantic satiation has typically been studied via repetition of single words, decreased meaningfulness being indexed by reduced polarization of semantic differential profiles or by reduced availability in tasks depending on the meaning of the word (cf., Harriet Amster, 1964 for review). It would seem to be both experimentally feasible and theoretically interesting to satiate abstract semantic features, i.e., by rapid repetition of different words sharing some feature in common rather than the same word. If the satiation effect is due to reactive inhibition of the representational mediating process, and if representational mediators are correctly characterized as sets of distinctive components or features, then feature satiation should be demonstrable under appropriate conditions. Furthermore, positive results would be entirely consistent with a behavioral theory of meaning, but not in any obvious way derivable from mentalistic theories. To date we have tried two experiments along these lines -- without notable success.

The first experiment was carefully ill-conceived by the author.[39]

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[39] CEO designed this experiment, in consultation with Leon Jakobovits and Marilyn Wilkins; Dr. Wilkins designed the computer program for

PLATO (an automated teaching and research device), ran the subjects and analysed the data.

Six sets of ten verbs (five + and five — in coding) and ten adverbs (five + and five —) were selected, each set to represent as clearly and purely as possible a given feature; the six features used were Moral/Immoral, Potent/Impotent, Active/Passive, Associative/Dissociative, Ego/Alter and Supraordinate/Subordinate. The verbs and adverbs in each set were combined so as to yield 100 IPV/AV phrases, 50 apposite (+ + or — —) and 50 anomalous (+ — or — +). A control list was generated by randomly sampling approximately equal numbers of items of each type from the six experimental lists. The 100 items in each list were presented on PLATO display screens to groups of about 20 subjects at a time, individual subjects getting different sequences of lists (serving as their own controls) and pacing themselves -- which is one of the advantages of using PLATO in research. [40] They were instructed to judge each phrase

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[40] We wish to express our appreciation to Ping koo, Meredith Richards, and the PLATO staff, particularly Mrs. Elizabeth R. Lyman, for the help they have given us with this and other experiments.

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as "acceptable" or "unacceptable" in literal ordinary English by pressing keys marked YES or NO as rapidly as possible; they could correct when they felt they had made errors. Responses, latencies and corrections were automatically recorded and stored on magnetic

tape for subsequent analysis.

We predicted that satiation would develop faster for the experimental lists (constant feature) than for the control list (varied features), this to be reflected in longer latencies and more errors as the task continued. This is where the ill-conception occurred: My own behavioral theory assumes semantic features to be based in reciprocally antagonistic reaction systems; excitation in one direction (+ coding) involving inhibition, or "rest," of the antagonistic direction (— coding). If, as in this design-and unlike satiation of a single word meaning - positive and negative reactions are balanced throughout the repetition sequence, then one would expect satiation effects to be minimized if not washed out altogether. This is what seemed to happen in this experiment. Experimental lists produced consistently shorter latencies and fewer errors from the beginning (presumably because of the added difficulty of shifting "set" in the mixed, control list), and this difference became quite marked near the end of the task, where only the control list showed any evidence of "satiation."

There was some "fall-out" from this experiment, however, suggestin the psychological validity of the feature modal: (1) Mean latencies for right responses (punching YES for $+^{+}$ and $-^{-}$ NO for + — and —+) were significantly shorter than for wrong responses, where "right" and "wrong" are specified by a priori codings, and 90% of corrections made by subjects were consistent with the codings. (2) When both latencies and errors are categorized by phrase types (I, +V+AV; II, +V —AV; III, --V+AV; IV, — V—AV), certain interesting regularities

appear. Every significant I (+ +) vs. IV (— —) difference for particular features (except the control list) shows positive congruence to yield shorter latencies and fewer errors than negative congruence -- which probably indicates a tendency to associate good, strong, active and associative words with YES (the "correct" key) and their opposites with NO (the "incorrect" key). Ego/Alter and Supraordinate/Subordinate features do not show this effect. This interpretation is supported by the fact that errors for type IV (punching NO to — — items) are much more frequently corrected than are errors for anomalous type II and III (punching YES to + — or — + items); apparently subjects quickly recognize errors of the former type but not of the anomalous type. (3) For all features except the evaluative ones (Morality and Associativeness), significantly more errors are made by punching YES to anomalous items where the adverb is coded + (Type III, — +) than where the verb is coded + (Type II, + —); this suggests that modifying adverbs have more weight than modified verbs in determining judgments (e.g., on Ego/Alter desire generously produces many more false YES responses than console desperately). Finally, (4) for single-feature lists and for the mixed control list there were consistently high correlations (between + .70 to + .90) between proportions of subjects giving YES responses and the inverse of distances (D-measures) between verbs and adverbs, as computed from their paired a priori code strips. In other words, as theoretical semantic similarity increases, so does judged acceptability of the V/AV pairs -- which is a general validation of the a priori features.

A second experiment was carefully designed by Sara Smith,[41] to correct the flaws in the earlier study and to use subjects and test

[41]"Satiation and Generation of Semantic Features", by Sara Smith, Masters Thesis, 1968, University of Illinois.

words as their own controls. The basic purpose was still to see if semantic features, rather than specific word-meanings, could be manipulated by repetition treatment. By varying the codings of repeated and test words simultaneously on three features (Moral/Immoral, Ego/Alter, and Supraordinate/Subordinate), satiation effects (where the repeated words have the same sign as a given test word on a given feature), generation effects (where repeated words have the opposite sign as a given test word on a given feature) and null effects where repeated words are unmarked on a feature for which the test word is signed) can be predicted for the same test words and subjects. Rather than having + and − codings alternating during the repetition task (as in the above experiment), the words repeated had constant signs on each of the three features.

Repetition verbs were carefully selected, both by a priori features and by pilot-test scaling, so as to have either + 0 −, − -- 0, or 0 + + on the three features respectively; there were 10 such verbs in each set. The test words were similarly selected, but so as to have + -- + or − + − on the same three features. Thus for the first type of repetition and the first type of test, we would predict satiation on Moral/Immoral, null on Ego/Alter and generation on Supraordinate/Subordinate, and so forth throughout the possible permutations. The repetition task itself was designed to force

utilization of the features in question, by having subjects rapidly select adverbs that went best with each of the 10 verbs from pairs judged equivalent as far as the features in question were concerned, e.g., flatter meanly vs. flatter insincerely. Results were analysed by the usual comparison of pre-repetition and post-repetition scores, both where a shift from +1 to −1 on the scale is considered no change in polarization (Jakobovits and Lambert, 1962) and by a method in which such cross-the-middle shifts are considered to be changes in meaning.

"The best laid plans of mice and men. . ."--the predictions were not confirmed, and nothing readily interpretable was found. In my own experience, semantic satiation is a very delicate phenomenon, easily influenced by apparently minor changes in procedure and highly susceptible to subjects' attitudes. Our repetition procedure was unusual, in that semantic judgments rather than simple repetitions of a single word were used, and it may be that only 10 repetitions is insufficient; our subjects were drawn from the Psychology Subject Pool, and one wonders about the attitudes of subjects serving five hours as guinea pigs for course credit. Or, of course, semantic features may not have the properties attributed to them in behavior theory. However, since the theoretical significance of replicable demonstrations of semantic feature satiation and generation would be considerable, we shall continue work in this direction.

Word-finding Studies

Kenneth Forster and Sara Smith have devised a method for testing

the psycholinguistic validity of semantic features which, for lack of a better name, we have dubbed the "cross-word puzzle technique." It is like the Cloze Procedure, except that blanks are substitute for letters within words rather than for words within sentences. Subjects are shown cards on each of which is printed an incomplete word (interpersonal verb), such as I _ I T _ _ E and some level of semantic cue. In the pilot study already completed -- designed to demonstrate the feasibility of the technique -- four levels of cues were used: (1) no-cue (or control) condition; (2) same-semantic-field condition (e.g., "to repeat" for the above item); synonym condition (e.g., "to mimic"); and definition condition (the actual dictionary definition of IMITATE). There are two ways in which these little "puzzles" can be solved. One is a "perceptual" or insight process, in which the word occurs to the subject as complete whole suddently upon receiving the cue (and sometimes without any); the other is a more intellectual process, in which the subject mentally inserts letters in empty slots until some completions occur. We were interested in the former, and allowed subjects only one minute per card.

One theory of the matter involves the notion of feedback from the semantic system to the perceptual integration system (cf., Osgood, 1957). In ordinary decoding behavior, distinctive patterns of r_m (meanings) are dependent on and occur near-simultaneously with perceptual integrations of word forms; therefore the stimulus correlates of these reactions, s_m (functionally speaking), should acquire facilitative effects with respect to the corresponding

perceptual integrations. The more similar in meaning the cue words to the incomplete target word, the more similar should be their feedback to that normally correlated with presentation of the target word itself, and therefore the greater the probability of correctly integrating the incomplete word.

In the pilot study the four cue conditions were balanced within and between subjects, in such a way that each subject received each of six target words with one of the four types of cues and each target-word/cue-type combination was given to six subjects. A subject's score for an item was the reciprocal of the time taken to "discover" the target word, with one minute as the cut-off time. Means formed from the six subjects receiving the same target words under the four conditions and means formed from the six items of a given cue-type for each subject were computed, and separate one-way analyses of variance were made for these two measures. In both cases the effects of cue-type were significant and in the expected direction -- definition > synonym > same-semantic-field > no-cue in speed of correct identification.

Sara Smith is presently collecting data on interpersonal verbs as cues and targets in experiments designed to determine (1) if the cueing effect can be predicted from the numbers of shared a priori features, (2) if this effect varies with which features are shared, e.g., the Associative/Dissociative feature having more weight than th Ego/Alter feature, (3) if full feature differences (+ vs. —) reduce cueing effects more than half feature differences (± vs. 0), and (4) if actual interference with target-word identification (as compared with the no-cue condition) can be shown to increase as the number of

opposed features increases. In a related study, Anisfeld and Knapp[42] report that when subjects are asked to indicate whether each of 200 orally presented words had occurred earlier in the list or not, false recognitions were greater for associatively related and semantically related (synonymous) subsequents than for control words. They conclude that "words" are not stored as forms but as complexes of semantic features, and the greater the sharing of features the more likely false recognition.

[42] Moshe Anisfeld and Margaret Knapp. A pre-publication mimeo titled "Association, Synonymity, and Directionality in False Recognition."

Conclusions on Validation Checks

The several tests of the psycholinguistic reality of the *a priori* semantic features of interpersonal verbs reported in this section lead to the following conclusions: First, certain of these features are more salient for ordinary speakers than others, influence their behavior more in the tasks we set them, and in this sense are more "real." Rotation of subject data onto *a priori* features via PROCRUSTES, feature identification in the strings subjects produce in the semantic word game, and preliminary data on word-finding with various types of cues agree in suggesting three levels of salience. Associative/Dissociative, Supraordinate/Subordinate and Ego/Alter Orientation are most salient when ordinary English speakers make judgments about interpersonal verbs and

adverbs; Moral/Immoral, Dynamism (Potent-Active/Impotent-Passive) and Future/Past Orientation have moderate salience; and Initiating/Reacting, Terminal/Interminal and Deliberate/Impulsive are rarely evident in the subjects' behaviors. The tendency of subjects to fuse features in certain ways (e.g., Dynamic, Supraordinate, Ego-oriented Dissociative behaviors as against their opposites) was evident here as in the application of discovery procedures. When instructed ordinary speakers are given scales defined by features and rate IPV's on them, extremely high correspondence between a priori and subject feature assignments is obtained (with the sole exception of Deliberate/Impulsive). This clearly indicates that the meanings of IPV's are differentiable in ways corresponding to the proposed features. To date, we have been unsuccessful in demonstrating satiation of semantic features as opposed to the meanings of single words.

Some Cross-cultural and Cross-linguistic Comparisons

One of the goals of our research program, it will be recalled, is to determine the degree of generality of semantic features across human groups differing in language and culture. From the viewpoint of psycholinguistic theory, demonstration of shared features would contribute to our understanding of language universals; from a more practical viewpoint, it could provide a set of constants against which to measure cultural differences in norms of interpersonal behavior. Even though discovery and validation procedures have not yet been worked out satisfactorily for American English, by any means, a number of cross-cultural studies have been made in an exploratory fashion. And, as might be expected, problems have multiplied --

particularly problems associated with translation and the interpretation of observed differences.

Native vs. Non-native English Speakers

It seems reasonable to expect that speakers of English as a second language would be less sensitive to anomalies than speakers of English as the first or native language. Upon returning to Australia, Kenneth Forster compared a group of Asians and Europeans who had been speaking English in Australia for about five years with a group of native-born Australians, the groups being comparable in other respects. A reduced version of the IPV/AV intersection given to the Illinois student subjects was used, with the Australian subjects also asked to judge each verb-adverb phrase as being apposite, permissable or anomalous. The results partially supported our expectation, in that the non-native speakers did judge fewer items to be anomalous. But the remarkable finding was that, when the intersection data for the two groups were factor analysed, the structures for native and non-native speakers were virtually identical. Using a factor-matching program devised by Kaiser, coefficients in excess of .98 for four of five extracted factors were found.

As a check on reliability, 40 of the items in this test were repeated. Although the reliabilities of the mean judgments for both groups were about .95, there were large variations in individual subject reliablilities, ranging from the high .90's to about .20. Native and non-native groups were then divided into high-reliability and low-reliability subgroups of 10 subjects each, and the IPV/AV

intersection data for each group were factored separately. Once again the factor-matches across all groups were excellent.[43] It would appear that even though native and non-native speakers may

[43]It should be noted that test-retest reliablilities for the means of the low reliability groups were still in the .90's, and the factor analyses operated on the means.

differ in sensitivity to semantic nuances in a language, and even though both may vary in the stability of their judgments, the same general features appear in the data they generate. As far as non-native (but reasonably fluent) speakers are concerned, the existence of a universal semantic feature framewrok would be expected to facilitate transfer of competence from one language to another.

Japanese Japanese vs. American English Speakers[44]

The same 30 verbs and 30 adverbs that had been used in the IPV/AV intersection test with Illinois student subjects were

[44]This comparative study was undertaken in cooperation with Drs. Agnes Niyekawa (University of Hawaii at that time) and Kenneth Forster.

translated into Japanese by Dr. Agnes Niyekawa, along with the instructions, and the "same" test was then given to a group of 40 monolingual college students in Japan. As a first step in analysis

of these data, a 30 verb X 30 adverb table was used to record all IPV/AV combinations on which the modal[45] judgments of appositeness, permissiveness and anomally by Japanese and American subjects differed.

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[45]If 25/40 subjects judged an item merely permissable, it was scored 0; for all other items, ratios of apposite to anomalous greater than 3-to-1 were scored +, ratios of anomalous to apposite greater than 2-to-1 were scored —, and the remainder scored 0 also. There was a slight positive bias in both sets of data.

Of the total 900 items, 68% had identical modal judgments for Japanese and Americans, 24% disagreed by a half step (i.e., + 0, 0 —, etc., one culture considering apposite or anomalous what the other considered merely permissable), and only 8% disagreed completely (one group judging apposite what the other judged anomalous). These over-all percentages indicate reasonable agreement. Furthermore, it will be recalled that I expressed some doubts about the reliability of the Illinois data, from subjects in a "pool" serving as a course requirement as a matter of fact, I agreed with the Japanese judgments in a considerable number of cases.[46] If the items on which I agree with the Japanese (6%) were added to the total

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[46]Some examples are the following: nurse excitedly (A 0, J —); display affection for selfishly (A +, J 0); compete, cooperate, help, manipulate and disregard emphatically (A +, J —); console and plead

with efficiently (A +, J —); plead with and manipulate angrily (A 0, J —); confide in rashly (A —, J 0).

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percent agreement, it would rise to 74%.

What about sets of items where Americans (including CEO) disagree with the Japanese judgments consistently? The Japanese consider it fitting to learn from submissively, desperately and timidly (not Americans); Japanese say one can't forgive sincerely, warmly or impulsively (Americans say one can); Japanese judge it fitting to congratualte successfully and drastically but anomalous to congratulate appropriately (Americans just the reverse). As for adverbs, the Japanese find it fitting to imitate, console, cooperate, nurse, and contradict desperately (for Americans these are merely permissive combinations); and whereas for Japanese almost all interpersonal verbs are anomalous when done appropriately, for Americans the same verbs are all apposite when done appropriately!

How is one to interpret such differences? The first possibility is that they are due to translation failures -- the referent (interpersonal behavior or actor state) of the Japanese translation differs from that of the English verb or adverb. If translation fidelity can be assumed, then a second possibility is that differences are due to semantics -- the features being used may vary, or, if they are the same, then codings of translation-equivalent terms upon the features may differ. The third possibility is strictly cultural -- norms of interpersonal behavior may render inappropriate the modes of human

relationship implied by adequately translated and semantically acceptable combinations. For example, to compete quietly is judged apposite by Americans and anomalous by Japanese: (1) The adverb quietly may have been translated into a Japanese form which would actually back-translate as English comtemplatively, which Americans would also judge anomalous when combined with compete. (2) Translation may be adequate, but compete (in Japanese) is coded + rather than 0 on the Activity feature and hence is anomalous with quietly.[47] (3) Although the translation is adequate and there is no semantic anomally,

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[47]One could argue that this is also a translation failure; although compete is the "best" translation of the Japanese form (and vice versa) it is not a "perfect" translation, since its features are not idential -- and in many, if not most, translations this will be the case. Translation "failure" is used here in cases where a better translation was demonstably available.

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it is simply a cultural fact about Japanese society that competition is expected to be an overt, "noisy" business (this is merely an example, of course!)

Before one can attempt to discriminate between semantic and cultural determinants of differences, it is necessary to eliminate translation failures as far as possible. Accordingly, Agnes Niyekawa arranged for six reasonably coordinate English/Japanese bilinguals[48] to translate her Japanese translations of the 30 verbs and 30 adverbs

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[48]We wish to thank particularly Miho Steinberg and her brother, Peter Tanaka for their careful work on this task.

back into English. Column (4) in Table 15 gives the dominant back

TABLE 15 ABOUT HERE

translations (S means same as original English and none means no dominant translation). Although some of the non-identical back translations are near synonyms (e.g., inform/tell and selfishly/egotistically), many are not (e.g., defy/oppose, repel/refuse, successfully/well, and drastically/fiercely).

There are difficulties with back translation as a procedure. To use an example given me by Agnes Niyekawa, let us suppose that English verb play (which itself has some 68 different uses according to Webster's International Dictionary) is translated into Japanese asobu; asobu also has various senses, one of which is translatable as English loaf; now if, in back-translation, loaf comes out rather than play, this does not mean that asobu was an inadequate translation to begin with. This is particularly the case when words are translated out of context. To counteract this difficulty, we ran a subsequent scaling test, using seven bilinguals.[49] Sets of three English translation alternatives of each of Niyekawa's Japanese words -- the

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[49]At the suggestion of Dr. Danny Steinberg.

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original or "correct" English word, the dominant back-translation (if other than the original), and another word offered in the back-translation task -- were rated comparatively on a seven-step scale ranging from Excellent (1) to Poor (7). We assume that the set of three words serves to restrict the senses of the individual terms,

Table 15
Translation Analysis for American/Japanese Disagreements

A: For Verbs

Verbs	Total A/J Disagree	CEO Agrees w Jap.	Sig. Disagree-ments	Dominant Back Trans.	Preferred Alt. Trans.	Decision	"N Trans Based"	"N Real"
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
defy	7	1	2	oppose	oppose	X	1	6
imitate	8	1	3	S	S	++	2	6
display ffection	6	2	3	S	S	++	1	5
ridicule	10	4	2	laugh at	S	++	4	6
console	6	2	3	S	S	++	1	5
corrupt	8	2	4	S	make degenerate	+	2	6
cooperate	7	1	2	S	S	++	2	5
plead with	6	3	3	S	S	++	2	4
deceive	6	3	3	cheat	S	+	2	4
criticize	9	3	4	blame	accuse	X	3	6
confide in	6	1	2	disclose	S	+	3	3
protect	4	1	1	S	S	++	1	3
hinder	5	2	1	interfere w	S	++	1	4
show respect for	4	1	1	S	S	++	2	2
concede	4	2	1	compromise	yield	X	1	3
repel	6	2	3	refuse	reject	X	1	5
compete with	12	4	3	S	S	++	4	8
help	10	3	2	S	S	++	3	7
manipulate	9	4	2	S	S	++	1	8
nurse	4	2	2	S	S	++	1	3
contradict	9	3	5	oppose	S	+	2	7
disregard	5	3	0	ignore	ignore	X	1	4
inform	4	0	4	tell	S	+	2	2
congratulate	8	0	5	(none)	show delight	X	4	4
forgive	13	6	5	S	pardon	X	4	9
learn from	8	1	5	S	S	++	2	6
oppose	6	2	2	S	S	++	2	4
apologize	7	0	4	S	S	++	2	5
warn	7	3	3	announce	give notice	X	2	5
seduce	9	3	1	tempt	tempt	X	2	7

B: For Adverbs

Adverbs								
firmly	6	0	5	S	strongly	+	1	5
unfairly	8	3	1	dishonestly	unjustly	X	2	6
excitedly	8	3	2	S	S	++	1	7
hopefully	8	2	4	S	S	++	3	5
selfishly	5	2	1	excitedly	S	++	0	5
successfully	9	1	4	well	skillfully	X	3	6
emphatically	9	5	1	S	S	++	4	5
submissively	4	3	0	obediently	obediently	X	1	3
sincerely	6	1	4	S	S	++	3	3
efficiently	14	8	4	S	S	++	4	10
reluctantly	2	1	0	unwillingly	S	++	2	0
warmly	6	2	3	(none)	heartily	X	3	3
angrily	7	5	1	S	S	++	2	5
guiltily	2	0	0	S	S	++	02	2
contemptuously	7	3	0	S	S	++	4	3
appreciatively	4	2	0	thankfully	gratefully	X	2	2
despicably	8	3	3	cowardly	S	+	2	6
drastically	7	3	2	fiercely	fiercely	X	3	4
kindly	9	6	2	S	S	++	4	5
rashly	8	2	5	(none)	S	+	2	6
quietly	7	0	3	S	S	++	1	6
resolutely	5	2	2	firmly	S	++	3	2
impulsively	9	3	4	unexpectedly	S	+	5	4
generously	4	0	2	S	S	++	1	3
desperately	10	0	8	S	S	++	1	9
appropriately	21	0	13	guitably	(none)	X	5	16
unceasingly	5	2	0	continuously	S	++	2	.3
timidly	4	1	2	(none)	S	+	1	3
unwillingly	6	0	3	S	reluctantly	+	2	4
considerately	5	3	1	thoughtfully	S	+	1	4

to that common to all of them e.g., that the senses of to nurse as "to hold (as a grudge)" or as "to feed at the breast" are eliminated by combining nurse, look after and take care of. Column (5) in Table 15 gives the preferred (most Excellent) translations for each of the Japanese verbs and adverbs.

Column (6) in Table 15 gives my own decisions as to the adequacy of our translations. Where both tests yield something other than the original English term (e.g., defy to oppose, criticize to blame and accuse, drastically to fiercely), I call it a translation failure (marked X). In some of these cases, the alternatives are quasi-synonyms (like disregard to ignore and submissively to obediently) and probably would not affect interpretation of the data. Where a failure in back-translation is followed by a success in the preference test, I consider the translation adequate -- on the assumption that the correct English word is one of the legitimate senses of the Japanese term. When the preference test fails where the back-translation test had succeeded, I call the translation adequate if the preferred word is near-synonymous with the correct word (e.g., corrupt to make degenerate, unwillingly to reluctantly) but a translation failure if correct and preferred words are clearly not synonymous (e.g., forgive to pardon).[50] We end up with nine verbs and seven adverbs inadequately translated. When I say "inadequately translated" it must be realized

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[50]The one exception to these rules is firmly to strongly, where our two best bilinguals did prefer firmly in the second test.

that there may simply not be any Japanese word that differs from the Japanese translation the way the correct English word differs from the preferred English word semantically. There may not be any Japanese verb that includes the features of Impulsiveness and Subordinateness by which defy differs from oppose, for example.

Columns (1), (2) and (3), respectively, give the total number of American/Japanese disagreements in modal judgment, the number of cases where I would agree with the Japanese subjects, and the number of what I consider to be potentially significant disagreements (for semantic or cultural interpretation). Column (7) gives the number of disagreements which could be accounted for on the ground of inadequate translation -- that is, for each verb the number of inadequately translated adverbs with which it displayed disagreements and vica versa for each adverb. And, finally, column (8) gives the number of "real" disagreements between American and Japanese subjects open to semantic or cultural interpretation (which is simply column (1) minus column (7), since I do not here subtract the items where I happen to agree with the Japanese).

Before attempting to distinguish between semantic and cultural bases of the remaining disagreements (if, indeed, such a distinction can be made at all), it will be necessary to see to what extent Japanese use the same semantic features Americans do. Table 16 presents the results of a Varimax rotation of the first six factors

TABLE 16 ABOUT HERE

for adverbs in the Japanese intersection data.[51] The first factor

TABLE 16

Japanese Subject Data: Varimax Rotation of First Six Principal Axes Factors

	I	II	III	IV	V	VI
angrily	-.53	-.61	.05	-.43	.17	-.04
appreciatively	.79	.13	.36	.08	-.02	.29
appropriately	.80	-.17	.14	.24	-.08	.10
considerately	.87	.07	.16	-.15	-.18	-.22
contemptuously	-.34	-.28	-.36	-.62	-.01	-.07
desperately	.12	-.47	.56	.09	-.47	-.06
despicably	-.87	-.26	-.08	-.23	-.16	.06
drastically	-.20	-.92	-.12	-.01	.12	.06
efficiently	.13	.07	.81	.22	-.22	-.21
emphatically	.27	-.40	-.03	-.17	-.21	.76
excitedly	-.33	-.72	.17	-.19	.07	.38
firmly	.19	-.71	-.23	-.28	-.04	.29
gene ously	.67	.30	.42	-.29	.01	.13
guiltily	-.50	-.01	.25	-.24	-.61	.35
hopefully	.64	-.05	.65	.19	.02	.02
impulsively	.30	-.12	.21	-.47	-.56	.21
kindly	.79	.33	.33	-.05	-.12	.10
quietly	.69	-.16	.27	.00	-.03	.35
rashly	-.19	-.18	.13	-.66	-.01	.43
reluctantly	.12	-.08	.51	-.20	-.21	.14
resolutely	-.08	-.67	.28	-.59	.10	.05
selfishly	-.18	-.69	-.03	-.12	-.38	-.14
sincerely	.85	-.02	.44	.01	.03	.18
submissively	.62	.16	.46	.05	-.14	.46
successfully	.15	.02	.29	.17	-.78	.06
timidly	.30	-.17	.54	-.18	-.27	.51
unceasingly	.24	-.63	.28	.30	-.36	.23
unfairly	-.62	-.34	.38	-.08	.11	.14
unwillingly	.30	.14	.74	-.15	-.14	.27
warmly	.89	-.06	-.18	.21	-.15	.05

[51]This analysis was done by Forster in Melbourne. It will be noted tha it analyses adverb rather than verb relations, as previously reported; the choice is, in a sense, arbitrary.

is clearly the familiar Associatve/Dissociative feature (considerately, warmly, sincerely, appropriately, kindly, appreciatively as opposed to despicably, unfairly, angrily). The second factor appears to be a Dynamism feature (combination of Potency and Activity), characterized by the contrast between drastically, excitedly, firmly and kindly generously. Factor III is a uniquely Japanese factor which might be called "Subordinate Striving" (efficiently, reluctantly, unwillingly, hopefully, desperately) vs. "Supraordinate Complacency" (contemptuously and firmly). Factor IV appears to be a "Social Deliberateness" feature (appropriately, efficiently, unceasingly and warmly as opposed to rashly, contemptuously, resolutely, impulsively and angrily). Factor V is a reasonably clear (although unipolar) "Ego-oriented" feature, defined by successfully, guiltily, impulsively and desperately Factor VI is "Supraordinate/Subordinate" clearly enough, but the nature of it is strange, indeed -- with emphatically, timidly, submissively and rashly on one side and considerately and efficiently on the other. The total pattern has all the appearance of a transitional society, with traditional values and status markers in sharp conflict (among Japanese college students) with modern realities.

How similar is the Japanese adverb structure to the American? Forster used the PROCRUSTES factor-matching program to find an answer -- it will be recalled that PROCRUSTES generates the best "fit" of one set of data (here, the Japanese judgments of IPV/AV combinations)

to another set of data (here the Illinois subject-pool judgments of of same combinations). Table 17 gives the results of this analysis. It can be seen that the first factor is clearly Associative/Dissociative--

TABLE 17 ABOUT HERE

appreciatively, generously, kindly, sincerely, and warmly vs. despicably, unfairly, contemptuously and angrily -- but the Japanese would add guiltily, excitedly and selfishly to the list of dissociative motives. Factor II is again a Dynamism feature (unipolar), with emphatically, impulsively, rashly, excitedly, and firmly (the last a bit strange to Americans) heading the list. The Japanese would add selfishly, drastically and timidly to Dynamism, again suggestive of upward mobile members of a transitional society. Factor III transforms the American "Future-oriented" factor into the Japanese "Subordinate Striving" factor -- characterized by desperately, successfully, and efficiently. Factor IV seems to be a "Social Volatility vs. Deliberateness" kind of feature, with successfully, guiltily, impulsively, and despicably (and timidly) opposed to appropriately. Factor V, on the American side, looks like Subordinateness, but on the Japanese side it adds an "Alter-oriented and Moral" flavor (sincerely, appreciatively, and generously). Factor VI defies interpretation. Factor VII seems to be an attempt of PROCRUSTES to wed an American "Terminal/Interminal" factor (unceasingly, resolutely) with an "Ego-oriented" Japanese factor (unceasingly, desperately, drastically, selfishly).

Is it possible to distinguish purely semantic bases of disagreement between Americans and Japanese from cultural differences in their norms of interpersonal behavior? In the following interpretive analysis I have eliminated disagreements attributable to translation failures (as defined above by back-translation and preference tests) and I have been skeptical about disagreements where I happen to

TABLE 17

Best Match Via PROCRUSTES of Japanese Data to Illinois Subjects Factors

	I		II		III		IV		V		VI		VII	
	I	J	I	J	I	J	I	J	I	J	I	J	I	J
angrily	.70	.69	-.59	-.52										-.40
appreciatively	-.80	-.88								.57				
appropriately	-.44	-.71					.46		.45					
considerately	-.68	-.64							.62					
contemptuously	.74	.51	-.53	-.53								.44		
desperately					-.45	-.79	-.52	-.38						-.71
despicably	.85	.87						-.46						
drastically	.74	.45		-.52										-.72
efficiently					-.91	-.50								
emphatically			-.86	-.61										
excitedly		.41	-.58	-.55							-.41		-.40	-.53
firmly			-.77	-.72										-.46
generously	-.89	-.76								.67				
guiltily		.46					-.88	-.86						
hopefully	-.58	-.69			-.42					.54			-.41	-.39
impulsively			-.80	-.63				-.47						
kindly	-.85	-.75								.42				
quietly	-.71	-.59							.47	.53				
rashly	.69		-.60	-.62						.44				
reluctantly									.80	.53				
resolutely			-.40	-.74									-.75	-.55
selfishly		.44		-.53							.67	.61		-.57
sincerely	-.81	-.81								.64				
submissively	-.55	-.77							.57	.59				
successfully					-.89	-.61		-.63						
timidly	-.54	-.32		-.41				-.42	.69	.56				
unceasingly													-.77	-.74
unfairly	.75	.53												
unwillingly									.88	.64				
warmly	-.92	-.71												

agree with the Japanese subjects. If a set of disagreements can be related to a clear-cut difference in the factor analyses, then I attribute them to semantic coding. If not, I attribute them to culture -- buttressing this attribution with occasional commentary by Dr. Agnes Niyekawa.[52] Since it is the adverbs for which we have direct factor loadings, we begin with them.

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[52] Personal correspondence.

Disagreements on the usage of efficiently seem to be cultural, there being perfect agreement with Niyekawa's translation yet 10 unresolved items; according to Niyekawa, the Japanese word is restricted in usage to verbs related to productivity in work, having been introduced with industrialization. Thus one cannot corrupt or criticize efficiently in Japanese. Americans seem to be able to do just about anything efficiently! The fact that desperately and unwillingly are considered apposite combinations with imitate, console, and learn from is also interpreted as cultural by Dr. Niyekawa, and this she related to a syntactical device found in Japanese but not English -- the Causative Passive, in which the deep structure Actor is being forced into his actions by persons or conditions beyond his control. However, these same adverbs, along with efficiently, hopefully and reluctantly, define what I called the "Subordinate Striving" factor, so again the distinction between what is semantic and what is cultural is not clear. Disagreements on firmly suggest that it was a translation failure after all; if one substitutes strongly (the preferred back-translation for the majority of the bilinguals) for

firmly, then all of the strange items for Americans become acceptable, e.g., judgements of fitting for display affection, plead with, and show respect firmly.[53]

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[53]Ideally, we should give a new IPV/AV intersection test to American subjects, but with the preferred back-translations substituted, and see to what extent this eliminates disagreements -- but this remains to be done.

Apparently "semantic" are the following: The adverb excitedly is identified as Dissociative on PROCRUSTES, which would explain why the Japanese find protect excitedly and cooperate excitedly anomalous. Unlike English usage, sincerely is shown in PROCRUSTES to have definite Subordinate coding, hence the Japanese cannot contradict sincerely but they can learn from sincerely. On the Varimax factor IV, both contemptuously and resolutely fall on the Impulsive side, which would explain why the Japanese subjects cannot imitate, corrupt or seduce (all rather deliberate behaviors) contemptuously, whereas they find it fitting to defy resolutely. The adverb kindly is shown to be both non-Dynamic and Subordinate in the Japanese analyses, and we note that learn from kindly is an apposite combination for them but anomalous for Americans. From Varimax factor VI we discover that both rashly and emphatically (strangely for Americans) go along with timidly and submissively as Subordinate; appropriately enough, Japanese cannot ridicule rashly or emphatically, yet they can apologize both rashly and emphatically. On PROCRUSTES V quietly is coded both Alter-oriented and Moral, and our Japanese

subjects consider it anomalous to imitate, corrupt, deceive or compete quietly. Finally, considerately falls on the Supraordinate side of Varimax VI, and the Japanese subjects can protect and nurse considerately but they cannot congratulate or apologize considerately.

In interpreting the verb disagreements, I eliminate those already accounted for by the semantic codings of the adverbs with which they were combined as well as those attributable to translation failures. Very few sharp differences remain. It would appear that for Japanese repel, contradict and oppose are all Immoral as well as being Dissociative (rather than being coded 0 in Morality as for Americans); for example, to repel, contradict and oppose despicably are all apposite combinations for Japanese and merely permissable for Americans. Similarly, imitate and compete appear to be Immoral as well as Ego-oriented; Japanese cannot do either of these things quietly (+ Moral), for example. Confide in probably should have been considered a translation failure (the dominant back-translation was disclose to, cf., Table 15); the Japanese subjects consider confide in unwillingly to be an apposite combination. We are left with a few puzzling items: why do the Japanese consider it anomalous to display affection for, concede to, and help generously? Why can't they deceive hopefully?

By way of summarizing this exploratory comparison of American and Japanese interpersonal verb usage, we may first note the evidence for common semantic features. On nearly three fourths of the IPV/AV combinations, students from the two cultures give identical modal judgements, and on only 8% are they flatly opposed (apposites for one being anomalies for the other). Boththe Varimax and PROCRUSTES rotations provide evidence for sharing of Associative/Dissociative,

Dynamism, Supraordinate/Subordinate and Ego/Alter Orientation features and these, it will be remembered, regularly come through most clearly in our data for American subjects. But within these over-all similarities some striking cultural differences appear: For one thing, the Japanese college subjects fuse a Future-Striving feature (which Americans also have) with a varient of Subordinateness; the Japanese also fuse a Deliberate/Impulsive feature (which Americans also have) with what looks like a Social/Asocial feature; indeed, the entire Japanese description of Subordinateness (with efficiently and hopefully on Varimax IV and emphatically and rashly on Varimax VI) is quite strange to the American mind.

Is "subordinate striving" and an identification of "impulsiveness" with "asocial" behaviors as opposed to "deliberate and conforming" behaviors a valid characterization of major differences in the norms of interpersonal relations for Japanese vs. American college students? I find some confirming evidence in a study by Kenneth Berrien (1966) in which Japanese and American college students were compared in terms of 15 social needs (the Edwards Personality Preference Schedule). Japanese score significantly lower on deference (not accepting leadership of those they admire, not conforming to customs) and on dominance (not accepting leadership positions themselves, not defending their own point of view when attacked) than Americans, yet they score significantly higher than Ameircans simultaneously on abasement (accepting blame when things go wrong, feeling inferior to others) and on endurance (working hard, avoiding interuptions in their work). Both "subordinate striving" and conflict over "conforming" seem to be evident here. According to Berrien, ". . . the values appear to

conform with the stereotype of the Japanese general population as revealed by their cultural and politcal history."

Although only 8% of the IPV/AV pairs display extreme disagreement, this is still about 72 items. However, if disagreements attributable to translation failure and/or Illinois subject failure (those where I agree with the Japanese) are discounted, then only 22 maximal disagreements remain -- all of which were discussed above. Since nearly all of these "real" disagreements are based on adverbs marked on the uniquely Japanese features (factors), and since this is certainly interpretable as a cultural difference between Americans and Japanese, it would appear that one cannot really distinguish between "semantic" and "cultural" bases of disagreement. And this conclusion -- considering that Language is, after all, a part of Culture -- would seem to be in order.

A Semantic Feature Analysis of Thai Pronouns

Although not strictly speaking a comparative analysis, a study of Thai pronoun usage by W. Wichiarajote and Marilyn Wilkins does have implications for the universality of semantic features. Unlike English, where pronouns are distinguished mainly in terms of person, number, and sex, in Thai pronouns are also distinguished complexly on the basis of status relations between addresser and addressee. There are about 20 first-person pronouns translatable as "I" and an equal number translatable as "you," and when one Thai speaks with another he must keep in mind the relationship of himself to the other if he is to maintain social protocol. As a matter of fact, two Thai will avoid the use of personal pronouns

by circumlocution until they have enough information about each other to permit proper pronoun selection. Mr. Wichiarajote[40] decided

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[54]Mr. Wichiarajote is a graduate student from Thailand.

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to apply the procedures described in this paper to an analysis o the semantic features of Thai first-person pronouns. Since usage of these pronouns depends upon the role relations between speaker and hearer, rather than upon the linguistic context per se, the "intersection" was between 14 fairly common pronouns and 60 role-pairs (e.g., FATHER speaking to SON, OFFICIAL to CITIZEN, PUPIL to TEACHER, and so on), the role pairs being selected to sample a wide variety of role relations.

Based on Wichiarajote's familiarity with Thai culture and language, 11 a priori features were intuited: Sex (male/female), Age (old/young), Status (high/low), Formality (formal/informal), Urbanity (urban/rural), Social Distance (close/distant), Politeness (polite/impolite), Nobility (noble/common), Potency (potent/impotent), Kinship (relative/non-relative), and Titleship (title/non-title). The 14 pronouns and 60 role-pairs were individually and independently coded (+, 0, —) on these 11 features, always in terms of the speaker (left-hand member of the role-pairs). Then the code-strip of each pronoun was matched with the code-strip of each role-pair and the programmed rules of the discrete model used to predict the judgment of each pronoun role-pair combination (i.e., opposed signs on any feature yielding anomaly, etc. -- cf. pages 34-35 here); this process yielded a 14 (pronoun) X 60 (role-pair) Predicted Matrix.

This matrix is actually the "hypothesis" being tested in the study. Empirical data were collected from 53 native Thai subjects (undergraduate students in the United States), by having them assign a plus (fitting), zero (permissible) or minus (anomalous) sign to each pronoun/role-pair combination in the usual fashion. The 14 X 60 matrix (averages across subjects) generated in this manner constitutes the data or Target Matrix.

An interesting innovation in this study was the use of all a priori features simultaneously, as they determine the Predicted Matrix, as if this were the final stage of application of the Forster Feature Analysis Program. Thus, this is not a "discovery" procedure, but rather a "test" procedure for intuited features. Matching of the Target and Predicted Matrices yields a Residual Matrix, which can be checked for percentage of correct and unpatchable cells. The first run yielded 65% correct and 14% unpatchable. A few modifications in coding and changes in the cut-off points for assigning discrete signs to the Target Matrix were undertaken twice (three cycles through the analysis procedures). The third Residual Matrix yielded 84% correctly predicted cells and only 9% unpatchable errors.

A principal axis factor analysis and varimax rotation was applied to the raw subject data, the correlations being taken between role-pairs across pronouns. Only six factors accounted for 94% of the total variance. By inspecting the role-pairs having the highest loadings on each factor, it was possible to make assignments of Wichiarajote's a priori features to the six factors (that is, in terms of the sharing of particular features by the high-loading role-pairs). Table 18 summarizes these results. The first factor, called Potency

TABLE 18 ABOUT HERE

TABLE 18

Role-pair Factor Analysis and Varimax Rotation

Related to A Priori Thai Pronoun Features

FACTOR	PROPOSED SOCIAL TRAIT	% VARIANCE	CORRESPONDING A PRIORI FEATURE
I	Potency	40	Potency, Status, Nobility, Titleship, Urbanity
II	Deference	22	Politeness
III	Kinship	11	Kinship
IV	Sex	10	Sex
V	Age	5	Age
VI	Social Distance	6	Social Distance, Formality

by the investigators, shows highest loadings for OFFICER to PRIVATE, OFFICIAL to FARMER, PRIME MINISTER to OFFICIAL, LAD to LASS, DOCTOR to PATIENT, EDUCATED to UNEDUCATED, OFFICIAL to CITIZEN, and NOBLE BOSS to COMMONS. I would be inclined to relate this feature to the Supraordinate/Subordinate feature of our interpersonal verb analyses. Factor II, labeled Deference, displays highest loadings for LAYMAN to MONK, OFFICIAL to PRIME MINISTER, JUNIOR OFFICIAL to SENIOR OFFICIAL, EMPLOYEE to EMPLOYER and PAUPER to MILLIONAIRE. It is identified with *a priori* Politeness in the pronoun system, and seems to represent the other pole of the Supraordinate/Subordinate verb feature. Factor III, labeled Kinship, loads highest for FATHER to SON, FATHER to DAUGHTER, ELDER BROTHER to YOUNGER BROTHER, and FATHER-IN-LAW to SON-IN-LAW -- clearly Kinship, but also in terms of Supraordinateness. FACTOR IV, termed Sex, shows highest loadings for WOMAN to MAN, LASS to LAD, and WIFE to HUSBAND -- and, again, it appears that *male* is Supraordinate. Factor V, Age, loads highest for DAUGHTER to FATHER, DAUGHTER-IN-LAW to MOTHER-IN-LAW, PUPIL to TEACHER and CHILD to ADULT -- again combining Subordinateness with a specific social feature, Age. Finally, Factor VI, labeled Social Distance (or Hostility) by the investigators, shows highest loadings for MR. A. to OPPONENT, HOODLUM to HOODLUM. ANGRY MAN to MR. A and CHINESE to THAI (!) -- clearly our Associative-Dissociative interpersonal verb feature without Supraordinateness.

Several aspects of this study are of special interest. There is, first, the obvious utilization of semantic features that also occur in American English, although in form-classes other than pro-

nouns (except for Sex). The two dominant features operating appear to be Supraordinateness and Associativeness. This testifies to the universality of these semantic features. Second, there is the fusion of the underlying Supraordinate/Subordinate feature -- which, of course, reflects the traditional Thai concern with status relations -- with features representing various specific social role differentia. Potency and Deference directly reflect the underlying status feature, but Supraordinateness fuses with Kinship (FATHER to DAUGHTER, etc.), Sex (LAD to LASS) and Age (ADULT to CHILD) as well. In other words, in Thai we have an explicit elaboration, reflected in semantics, of the universal Supraordinate/Subordinate feature. We may note also the convergence of a priori pronoun features - Potency, Status, Nobility, Titleship, and Urbanity (Urbans speaking to rurals and vica versa) - upon a single factor, here called Potency but intrepretable as Supraordinateness. Mr. Wichiarajote tells us that the traditional pronoun distinctions within these categories are breaking down in modern times, with the relevant pronouns being used interchangeably and a few dominant ones becoming more so. This would appear to be a very intriguing instance of mediated generalization among a set of very similar mediation processes, when the environmental supports for their discrimination break down.

Finally, there is evidence for a hierarchical structuring of the Thai pronoun features. When the 11 a priori features are ordered according to their differentiating power,[55] contingencies among the features in terms of codings across roles indicate a high

degree of "nesting" of lower-order features within higher-order

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[55] D.P. = $\frac{\text{number of coded roles}}{\text{total number of role}}$ X 100, i.e., the importance of a feature in discriminating among role-pairs.

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features. For example, only when role relations are coded + on Politeness (with a few exceptions) do any of the other features become relevant; it is when roles are already coded -- on Kinship (non-relative) that Titleship becomes relevant; and so on. This ordered "nesting" was sufficiently transitive for Wilkins to be able to construct the "nesting tree" shown in Figure 10. Of the 28 nestings predicted in this tree, 24 were confirmed in the feature-

FIGURE 10 ABOUT HERE

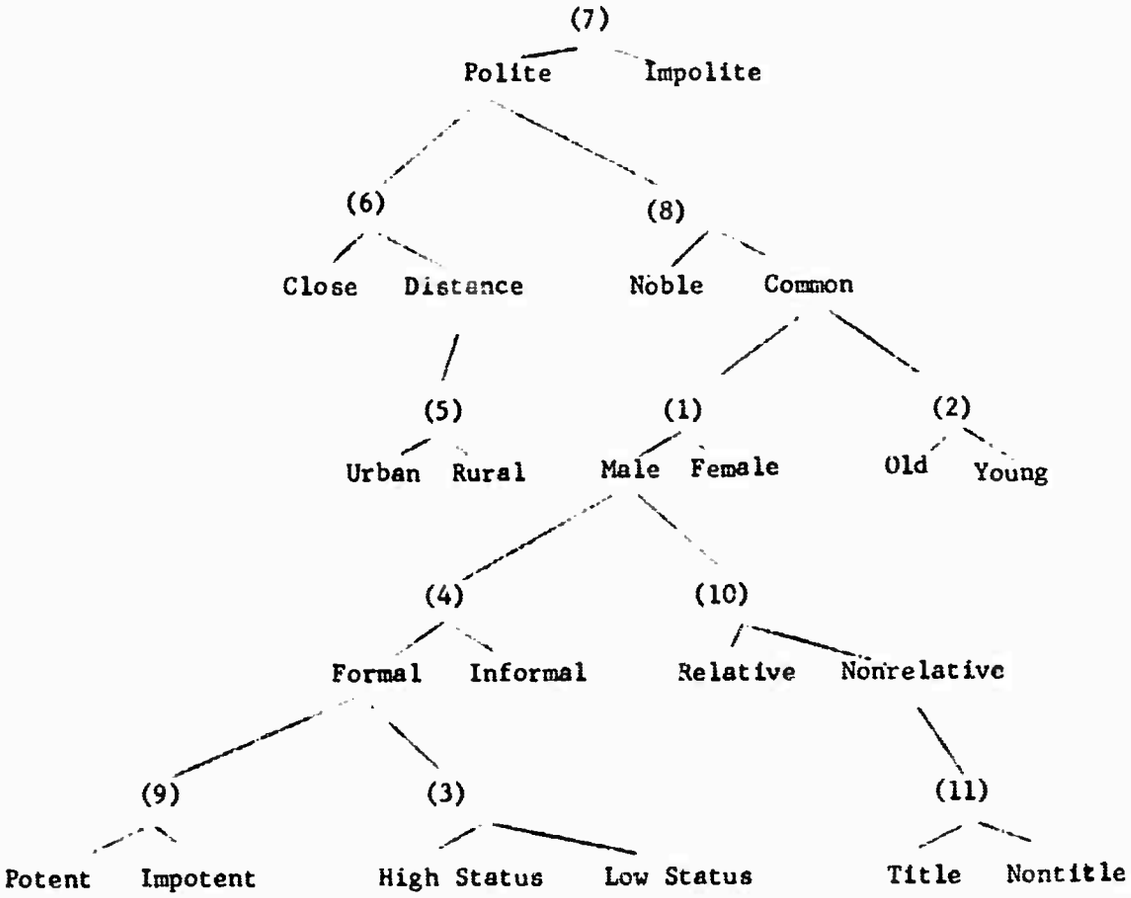
contingency data. One can imagine a rapid scanning process in which (going down the tree) the Thai speaker first determines if his relation to the listener is Polite, then if not-Noble, then if Male, then if the relation is Formal and then (given all of these conditions) his relative status to the listener -- all before choosing the appropriate pronoun. Although this hierarchical nesting system is by no means perfect for Thai pronoun semantics, it is much clearer than in the case of interpersonal verbs in English.

Cross-cultural Test of a Role Differential

A practical purpose behind our studies of the semantics of interpersonal verbs, it will be recalled, was to develop instruments for comparing norms of interpersonal behavior across cultures and languages. It was expected that people in different language/culture communities would share the same underlying feature system, but would

FIGURE 10

Hierarchical Structure of Thai A Priori Pronoun Features



differ in the weights given to features, in the codings of translation-equivalent verbs and roles, and particularly in the proscribed appropriateness of certain intentions for certain role relations. Although we had not demonstrated the universality of the IPV semantic features at the time, Hawaii seemed an ideal location in which to initiate a comparative study of role differentiation. Japanese college students in Tokyo, English-speaking college students of Japanes ancestry in Hawaii, and English-speaking college students in Illinois would serve as subjects. All possible 800 combinations of 20 IPV's

and

40 role-pairs (drawn from a set of 100 used by Triandis and his associates at Illinois) would be rated. The interpersonal verbs used are listed in Table 19 and the role-pairs in Table 20.

Since 800 items constituted too long a task, eight groups of 20 subjects each rated subsets of 100 items, role-pairs and verbs being rotated against each other through the entire 800 items so that repetitions of either were maximally separated. Each item appeared as follows:

FATHER <u>to</u> <u>defy</u> SON

never seldom sometimes depends often usually always

with the subject instructed to encircle the appropriate quantifier . In the instructions, <u>never</u> was specified as "practically zero % of the time," <u>seldom</u> as "from 1 to 20 % of the time," <u>sometimes</u> as "from 20 to 40 %," <u>depends</u> as from "40 to 60 %," and equivalently for the other side of the scale. After some discussion, it was decided to use "actual" (how people <u>actually</u> behave toward each other) rather than

"appropriateness" (how people ought to behave),[56] with the thought that ideal cultures might be too polarized and obscure differences.

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[56] A subsequent comparison of the two types of instructions by Marilyn Wilkins, using Illinois subjects and only Form A (first 100 items), suggests that this was a wise decision. The "appropriateness" instructions produced greater, not lesser, item variance than the "actual" instructions and the item means were pushed outward, either toward never or always, depending on the Social Desirability of the interpersonal verbs involved.

With the exception of two IPV's (keep at a distance and attract the attention of), all verbs were among those taanslated by Agnes Niyekawa and tested in the previously described study. In the present instance, we would expect translation difficulties to show up in consistent differences between Illinois-Hawaiian means (same language) and Japanese means. The greatest apparent offender is show respect for, with Japanese subjects attributing less of it to 30 of the 40 role relations; since this verb was successfully translated, by both tests, we assume this is characteristic of Japanese (college student) culture -- and it is consistent with Barrien's observations cited earlier. For verbs which were considered to be translation failures (defy better translated as oppose, criticize better as blame or accuse, confide in perhaps better as disclose to, and concede to perhaps better as compromise or yield), only confide in shows consistent Illinois-Hawaiian vs. Japanese differences (12/40 role-pairs) and should be considered a translation failure for present purposes. It would appear that the semantic shifts involved in defy to oppose, criticize to blame,

and concede to to yield have little effect upon appropriateness judgments in role relations, even though they may influence acceptability judgments of IPV/AV combinations.

To obtain an overview of the role differential data, factor analyses for both behaviors-across-roles and roles-across-behaviors were run separately for each language/culture community. Factor matching of the first four rotated factors across cultures proved to be simple in both cases, testifying to the underlying similarities. Table 19 gives the results for interpersonal behaviors. Those IPV's having large and con-

TABLE 19 ABOUT HERE

sistent loadings for all three cultures may be used as identifiers of the factors, and inspection of those role relations having the most extreme ratings on these IPV's -- again consistently across cultures -- helps to clarify the semantic quality of the factors.

Verb Factor I has its highest negative loadings on cooperate with, and show respect for and its highest positive loadings on defy, ridicule criticize and hinder; it would thus appear to be some variant of Associative/Dissociative. Factor II has its highest positive loadings on display arfection for, console, protect, and help and its only high negative loading on keep at a distance; it would thus appear to be some other variant of Associative/Dissociative. However, the verbs in Factor I suggest Formal Associative relations, and the extremely rated role-pairs confirm this inference -- PATIENT to DOCTOR, SALES PERSON to CUSTOMER, HOST to GUEST and vica versa and TEACHER to STUDENT being Formally Associative and STRANGER to LOCAL PERSON, OLD PERSON to YCUNG PERSON and, interestingly enough, MAN to WCMAN being Formally Dissociative. The verbs in Factor II suggest Intimate Associative vs. Remote Dissociative

Table 19

Rotated Factors and Variances for Interpersonal Verbs for Illinois (I), Hawaiian (H) and Japanese (J) Subjects

	I			II			III			IV		
	I (17%)	H (28%)	J (25%)	I (27%)	H (21%)	J (25%)	I (14%)	H (14%)	J (20%)	I (19%)	H (10%)	J (7%)
1. Defy	74	86	90	-06	-15	-13	08	14	-12	-49	-10	03
2. Imitate	-08	27	03	-09	-12	-18	46	59	83	-59	02	-36
3. Display affection for	13	13	-03	88	73	83	21	18	16	-02	-28	09
4. Ridicule	72	87	72	-77	-10	-47	-05	07	02	-51	22	-16
5. Console	04	04	08	90	91	82	-25	-20	-11	-08	-11	-25
6. Corrupt	20	67	79	08	-01	07	-26	-07	02	-80	-52	-23
7. Cooperate with	-60	-48	-11	48	30	75	35	51	46	14	-23	11
8. Deceive	35	55	64	-19	-38	15	41	24	02	-70	-56	-39
9. Plead with	40	26	02	53	44	-05	65	62	90	08	28	02
10. Criticize	82	76	80	-04	10	-34	-10	-15	03	-04	04	08
11. Confide in	-17	04	07	61	49	34	56	71	66	-31	-34	-52
12. Portect	-11	-29	-11	86	85	89	-11	01	-12	23	22	08
13. Hinder	50	78	68	-28	-29	-35	-12	-07	-21	-64	-20	-38
14. Show respect for	-37	-54	-11	66	41	14	44	55	92	14	-07	06
15. Concede	-12	-20	-05	-01	-27	07	92	80	87	01	-20	19
16. Keep at a distance	51	52	55	-77	-65	-63	-06	-11	-15	-13	17	-02
17. Compete with	17	76	51	05	-01	-17	-04	11	00	-92	-31	-70
18. Help	-46	-51	-05	79	72	89	-19	-01	01	19	07	04
19. Manipulate	21	40	66	37	26	52	-48	-43	-12	-39	-31	-08
20. Attract attention of	-17	01	61	46	20	39	22	10	25	-29	-83	04

and again the extremely rated roles confirm the inference -- HUSBAND to WIFE, WIFE to HUSBAND and GIRL FRIEND to GIRL FRIEND being distinctively Intimate and LOCAL PERSON to STRANGER, CITIZEN to POLITICAL LEADER and, interestingly, BOY FRIEND to BOY FRIEND being consistently Remote. Most parental relations (FATHER to DAUGHTER and vica versa, MOTHER to SON and vica versa, but not FATHER to SON) are rated high on both Formal and Intimate Associativeness, whereas PERSON to HIS OPPONENT is rated extremely negative on both factors. Appropriately enough, EMPLOYEE to EMPLOYER is simultaneously Formally Associative but Remote.

Verb Factor III is clearly Supraordinate/Subordinate across all groups, although it is unipolar; plead with and concede to have the highest positive loadings (Subordinate) and, except for the Japanese, manipulate represents the other direction. The extremely rated role-pairs confirm this identification: FATHER to SON and to DAUGHTER, EMPLOYER to EMPLOYEE, DOCTOR to PATIENT, TEACHER to STUDENT and POLITICAL LEADER to CITIZEN are all highly Supraordinate while all of their opposite role relations (e.g., SON to FATHER, STUDENT to TEACHER, and so on) are highly Subordinate. The fourth verb factor shows the least scale consistency. The only common theme seems to be Immorality: corrupt deceive, hinder and compete with for Illinois; corrupt, deceive and attrac the attention of for Hawaii; compete with, confide in (trans. disclose to) deceive and imitate for Japan. The role-pairs consistently differentiated by these verbs are interesting -- cross-sex parental and nuturent professional being what might be called Morally Alter-oriented (MOTHER to SON, FATHER to DAUGHTER, SON to MOTHER, DAUGHTER to FATHER, DOCTOR to PATIENT, PATIENT to DOCTOR, and TEACHER to STUDENT, but not STUDENT to TEACHER)

and various remote relations (permitting immoral behavior?) being what might be called Immorally Ego-oriented (PERSON to OPPONENT, LIGHT SKINNED PERSON to LIGHT SKINNED PERSON and LIGHT SKINNED PERSON to DARK SKINNED PERSON -- but not DARK SKINNED PERSON to DARK SKINNED PERSON).

Some sharp differences in verb loadings are worth noting: corrupt is less Dissociative but more Immoral for Illinoians; cooperate with is less Formally Associative and more Intimately Associative for Japanese; hinder is more Immoral for Americans; show respect for is less Intimately Associative for Japanese but much more Subordinate; compete with is more Dissociative and much less Immoral for Hawaiians, but attract attention of is distinctly Immoral for the Hawaiians as compared with the others; help is less Formally Associative for the Japanese than the other groups. If one assumes that the four verb factors are shared (based on the sets of verbs with consistent loadings), then these differences can be interpreted as differences in semantic coding for the three cultures involved.

Commonness of interpersonal verb factors was expected and, indeed, hoped for; what was not expected, and not exactly hoped for in the interest of cross-cultural comparisons, was the extraordinarily high correspondence of role-pair factors taken across the IPV's, as evident in Table 20.

TABLE 20 ABOUT HERE

Since these factors tend to be unipolar, I will stress only the highest loading role-pairs in each case. Role Factor I identifies itself as what might be called Nurturence (Supraordinate Associativeness); culture-common role relations loading high are FATHER to SON, MOTHER to SON, EMPLOYER to EMPLOYEE, DOCTOR to PATIENT, POLICEMAN to CITIZEN, TEACHER to STUDENT and FATHER to DAUGHTER, and the lowest loading roles are STRANGER to LOCAL PERSON and PERSON to OPPONENT. Role Factor II identifies itself

TABLE 20

Rotated Factors and Variances for Interpersonal Role-pairs for Illinois (I), Hawaiian (H), and Japanese (J) Subjects

	I			II			III			IV		
	I	H	J	I	H	J	I	H	J	I	H	J
	(28%)	(39%)	(36%)	(18%)	(20%)	(27%)	(11%)	(8%)	(10%)	(27%)	(17%)	)
1. Father-Son	.91	.89	.94	.03	.15	.11	.03	-.07	-.04	.33	.24	
2. Employee-Employer	.11	.36	.20	.88	.84	.90	-.15	.00	-.17	.31	.31	.05
3. Old-Young	.85	.88	.40	-.18	-.16	.04	-.10	-.15	-.58	.08	.19	-.16
4. Light Skinned-Another	.11	.40	.62	-.04	-.04	.22	.14	.14	.26	.83	.82	.53
5. Patient-Doctor	.19	.21	-.05	.72	.84	.90	.31	.30	.25	.38	.25	.10
6. Host-Guest	.55	.73	.72	.30	.43	.61	.14	.12	.08	.63	.42	.00
7. Wife-Husband	.64	.74	.66	.22	.27	.56	.44	.22	.33	.53	.46	.32
8. Person-Opponent	-.28	-.36	-.38	-.00	-.02	-.31	-.71	-.71	-.78	-.32	-.06	-.12
9. Mother-Son	.87	.90	.85	.11	.19	.31	.25	.09	.19	.31	.25	.23
10. Citizen-Policeman	.01	.17	.17	.87	.83	.78	-.10	-.30	-.10	-.06	-.12	.08
11. Man-Woman	.75	.78	.90	-.05	-.01	.10	.19	-.00	.05	.47	.47	.00
12. One Sister-Another	.46	.72	.89	.04	.19	.14	.23	.26	.03	.78	.48	.33
13. Student-Teacher	.04	.26	-.09	.95	.85	.94	-.06	.02	-.11	-.05	.27	.07
14. Brother-Sister	.70	78	.76	.02	.31	.38	.00	.02	-.04	.51	.10	.30
15. Stranger-Local	-.32	-.23	-.10	.77	.52	.51	-.23	-.16	-.36	.05	.70	-.45
16. One Neighbor-Another	.41	.61	.44	.28	.39	.46	-.14	.12	.42	.82	.57	.50
17. Sales Person-Customer	.35	.50	.46	.44	.55	.67	-.01	-.14	.13	.42	.28	.09
18. Daughter-Father	.62	.65	.50	.37	.55	.76	.51	.34	.06	.31	.30	.21
19. Dark Skinned-Light Skinned	-.14	.00	-.17	.36	.55	.47	-.78	-.19	-.63	.11	.61	.10
20. Girl-Girl Friend	.26	.57	.32	.01	.20	.19	.06	.18	-.12	.93	.62	.83

TABLE 20 (Cont.)

	I	H	J	I	H	J	I	H	J	I	H	J
	28%	39%	36%	18%	20%	27%	11%	8%	10%	27%	17%	9%
21. Son-Father	.33	.46	.40	.53	.56	.72	.30	.39	.12	.60	.39	.29
22. Employer-Employee	.72	.76	.85	.35	.39	-.13	-.42	-.26	-.14	.09	.04	[illegible]
23. Young-Old	.39	.57	.73	.54	.58	.44	.33	.30	-.14	.52	.33	[illegible]
24. One Dark Skinned-Another	.37	.59	.66	.02	.20	.48	.33	.23	-.06	.80	.70	.40
25. Doctor-Patient	.77	.90	.94	.10	.18	.18	.12	.02	-.00	.46	.28	.16
26. Guest-Host	.46	.57	.10	.53	.57	.83	.09	.05	.26	.63	.49	.24
27. Husband-Wife	.65	.77	.83	.07	.19	.28	.30	.17	.20	.64	.47	.30
28. Boy-Boy Friend	.16	.48	.45	.15	.42	.30	-.09	.13	.04	.84	.43	.62
29. Son-Mother	.70	.76	.65	.39	.47	.65	.38	.25	.15	.31	.20	.15
30. Policeman-Citizen	.74	.80	.84	.20	.30	.31	-.30	-.09	-.17	.38	.18	.01
31. Woman-Man	.42	.37	.32	.08	.14	.57	.26	-.05	.10	.50	.58	.17
32. Worker-CoWorker	.43	.54	.57	.09	.19	.73	-.12	-.06	.16	.83	.73	.19
33. Teacher-Student	.78	.85	.90	.32	.31	.06	-.28	-.26	-.25	-.28	.07	.17
34. Sister-Brother	.67	.81	.55	.28	.33	.66	.11	.08	.00	.54	.30	.42
35. Local-Stranger	.25	.32	.12	.36	.34	.17	80	-.72	-.80	.15	.23	.05
36. One Brother-Another	.30	.59	.87	.11	.32	.03	.03	-.24	-.09	.90	.52	.38
37. Customer-Sales Person	.21	-.02	.15	.76	.72	-.23	-.28	-.37	-.80	-.07	.06	.28
38. Father-Daughter	.88	.93	.95	.14	.22	.18	.17	.06	-.01	.29	.11	.13
39. Ligh'-Skinned- Dark Skinned	.06	.18	-.08	.20	.06	-.38	-.81	-.91	-.68	-.41	-.16	-.42
40. Citizen-His Political Leader	.27	.54	.19	.65	.74	.77	-.23	-.05	-.19	.14	.07	-.15

as what might be called Dependence (Subordinate Associativeness); culture-common role relations are EMPLOYEE to EMPLOYER, PATIENT to DOCTOR, CITIZEN to POLICEMAN, and STUDENT to TEACHER -- and it is notable that the children to parents relations are not highly loaded, Factor II thus not being a mirron image of I. Factor III identifies itself neatly as an Intimacy/Remoteness dimension, and it is more bipolar; relatively Intimate relations for all cultures are PATIENT to DOCTOR, WIFE to HUSBAND, HUSBAND to WIFE, SON to MOTHER and (excepting Janapese) DAUGHTER to FATHER -- but not FATHER to DAUGHTER or SON nor MOTHER to SON -- and the very Remote relations are PERSON to OPPONENT, LOCAL PERSON to STRANGER (but not reverse) and LIGHT SKINNED PERSON to DARK SKINNED PERSON. Role Factor IV identifies itself with equal clarity as what I shall call Egalitarianism; the high loading relations are LIGHT SKINNED PERSON to ANOTHER, ONE NEIGHBOR to ANOTHER, GIRL to GIRL FRIEND, BOY to BOY FRIEND and ONE DARK SKINNED PERSON to ANOTHER and the lowest loading relations are, most interestingly, LIGHT SKINNED PERSON to DARK SKINNED PERSON and PERSON to OPPONENT, the former being more extreme than the latter.

Within this overall pattern of similarity, there are differences that are both quite consistent and intriguing. On Nurturence (I) the Japanese students see OLD to YOUNG relations as less so and YOUNG to OLD as more so, and MAN to WOMAN, HUSBAND to WIFE and BROTHER to ANOTHER are also seen as more Nurturent (protective?); the Illinois subjects attribute much less Nurturence to SISTER, BROTHER and BOY FRIEND relatio than the other groups, as well as to YOUNG toward OLD and LIGHT SKINNED toward DARK; only in SISTER to BROTHER and CITIZEN toward POLITICAL

LEADER do Hawaiians see more Nurturence. As to Dependence (II) differences are all on the Japanese side -- WIVES more on HUSBANDS, WOMEN more on MEN, DARK SKINNED to EACH OTHER, HOSTS more on GUESTS and WORKERS more on CO-WORKERS; for both DAUGHTER to FATHER and SON to FATHER relation a trend of increasing Dependence is noticeable from Illinoians through Hawaiians to Japanese; and whereas CUSTOMERS are highly Dependent upon SALES PERSONS for both groups of Americans, they are decidedly not so for Japanese. On the Intimacy/Remoteness dimension (III), CUSTOMERS are also extremely Remote from SALES PERSONS for Japanese, as are OLD from YOUNG and vica versa, as compared with the American groups; Illinoian see EMPLOYERS as more Remote from EMPLOYEES while Hawaiians, appropriately enough, see much less Remoteness between DARK SKINNED and LIGHT SKINNED PERSONS; the DAUGHTER toward FATHER (but <u>not</u> SON toward FATHER) relations progressively less Intimate from Illinoians through Hawaiians of Japanese ancestry to native Japanese. Finally, on Egalitarianism (IV) we observe a remarkably consistent trend on many role relations for Illinoians to be most Egalitarian, Hawaiians to be in the middle and Japanese to be least Egalitarian -- family relations (WIFE to HUSBAND and reverse, ONE SISTER to ANOTHER, SON to FATHER) as well as social and professional (GUEST to HOST and reverse, YOUNG to OLD, SALES PERSON to CUSTOMER, POLICEMAN to CITIZEN, WORKER to COWORKER and DOCTOR to PATIENT and reverse); the Hawaiian students stand out in seeing LIGHT SKINNED to DARK SKINNED and the reverse as relatively <u>more</u> Egalitarian and BROTHER to SISTER and the reverse as relatively <u>less</u> Egalitarian, and they stand at opposite poles from the Japanese in this respect for relations between STRANGERS and LOCAL PERSONS; the Japanese differ sharply

from both American groups in attributing less Egalitarianism to the relation between MAN and WOMAN -- and in both directions.

Do the a priori semantic features of interpersonal verbs display any consistent relations to the norms of interperson behavior, as inferred from the role differential? Several severe limitations of the present data must be emphasized as cautions against over-interpretation. First, the a priori features apply to American English at best, the hypothesis of universality remaining to be demonstrated. The IPV factor analyses given in Table 19 provide evidence for two types of Associativeness (Formal and Intimate), for a common Supraordinate/Subordinate feature, and perhaps for some combination of Moral and Ego/Alter features, but there is no evidence for other features. Second, the over-all similarities in the patterning of judgments about role relations across these cultures, evident in Table 20, will certainly reduce the likelihood of discovering fine differences in semantic feature assignments. And there remain, of course, questions as to the validity of some of the a priori features and the coding of IPV's on all of them.

One must also question the notion of "semantic anomaly" when applied to assertions relating role-pairs and interpersonal verbs. Since all IPV's by definition, so to speak, share higher-order codings on Transitiveness, Concreteness, Animateness and Humanness, any role subject or any role object should be semantically acceptable with any IPV. Thus FATHERS imitate successful people but not *Pebbles imitate successful people and Sons often defy FATHERS but not *Sons often defy pebbles. Therefore it is not semantically anomalous for any role-pair to accept any IPV, and one can certainly imagine some

human societies in which the assertion FATHERS imitate SONS would be entirely appropriate. Nevertheless, in most human societies it is culturally "anomalous" for FATHERS to imitate SONS, and so it would appear that "cultural features" corresponding to the semantic features of interpersonal verbs have been assigned or attributed to Actor-Object role-pairs. If such is the case, then one should be able to infer the "cultural features" of role-pairs from the shared semantic features of the IPV's that are considered appropriate or inappropriate in association with them.

As a first step in inferring such "cultural features", all role-pairs for each culture having mean appropriateness values on verbs greater than 5.0 (i.e., judged "usually" or "always") were assigned the feature code-strips for those IPV's; they were assigned the inverse code-strips (signs reversed) for those IPV's on which they had appropriateness values less than 3.0 (i.e., judged "seldom" or "never"). In the summation over all IPV's meeting these criteria, a ratio of 4-to-1 plus-over-minus, or the reverse, was required for assigning that coding to the role-pair. As could have been predicted from the factor analyses of roles, the "cultural features" of role-pairs proved to be very similar for Illinoians, Hawaiians and Japanese. A few marked differences do appear, however: EMPLOYEE to EMPLOYER is + Moral for H (Hawaiian) and J (Japanese), but zero for I (Illinois); OLD to YOUNG is Alter-oriented for I and J but zero for H, for whom however it is Impulsive; PERSON to OPPONENT is + Potent for I and H, but zero for J; CITIZEN to POLICEMAN is Passive for H and J but zero for I; STUDENT to TEACHER is Impotent, Passive and Past-oriented for J, but zero on these features for H and I; STRANGER

to LOCAL PERSON is Dissociative for I, but zero for H and J; NEIGHBOR to NEIGHBOR is coded Moral, Associative and Subordinate for H, but zero on these features for I and J; DAUGHTER to FATHER is Initiating for I and not for H and J, but Subordinate for H and J and not for I; both DAUGHTER to FATHER and SON to FATHER are coded Past-oriented by J, but zero by H and I; and, finally, WORKER to COWORKER is not Active and Future-oriented for J, as it is for I and H, but it is Subordinate for J.

General culture differences between Illinoians, Hawaiians of Japanese ancestry and native Japanese have already been noted in connection with the verb and role factor analyses. If we think of the Hawaiians as a group in transition between two cultures, Japanese and American, we may now ask in terms of particular role-behavior norms about some of the details of this process of culture change. All 800 tri-culture sets of role-pair/verb appropriateness means were inspected; any item displaying a difference equal to or larger than 0.9 scale units for any pair of cultures was assigned to one of four categories:

(I) I = H>J (Hawaiians and Illinoians more alike and differing from Japanese);
(II) I>H = J (Hawaiians and Japanese more alike and differing from Illinoians);
(III) I>H>J (progression from Illinoians to Hawaiians to Japanese); and
(IV) H>I = J (Hawaiians differing from both American and Japanese cultures).

Items in Category I presumably reflect American norms which have been largely adopted by Hawaiians of Japanese ancestry, and this constitutes the largest group of differences (150 of 800 items, or 19%). Items in Category II presumaby reflect Japanese norms which have tended to be preserved (42 items, or 5%) and those in Category III, similarly,

retardation in culture change (17 items, or 2%). Items in Category IV presumably reflect either "overshooting" of the American norms or norms unique to the multi-racial Hawaiian situation (35 items, 4%).

Clearly, the over-all picture is one of adaptation to American norms, but can we identify the regions of relatively complete and relatively retarded adaption, as well as those which appear to be uniquely Hawaiian? Table 21 lists the items falling in the four

TABLE 21 ABOUT HERE

categories simultaneously according to role-pairs and interpersonal verbs involved. The differences for particular role-pairs are worthy of inspection.[57] For example: Hawaiians of Japanese ancestry are like other Americans in seeing DAUGHTERS as confiding in and protecting

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[57] A little guidance in interpreting Table 21 is in order. First, all "values" are relative; the table says that Illinoians see FATHERS as ridiculing SONS more than either Hawaiians or Japanese -- but even for Illinoians the median judgment is only "sometimes". Second, the "greater than" (>) sign at the head of each column in relation to the actual ordering of the item means determined when not was prefixed to the IPV; thus it is FATHER not display affection for SON in column 1 because the Japanese had a higher mean value (5.9, "usually") than the Illinoians and Hawaiians (4.9 and 4.5, merely "often), indicating that I and H have lesser rather than greater tendency to display affection in FATHER/SON relations than J.

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but also as conceding to, not competing with and not imitating FATHERS (generally Associative, alter-oriented behaviors); Hawaiians are more like Japanese in seeing DAUGHTERS as not defying, not pleading

TABLE 21

Interpersonal Verbs Differentiating Role Relations Cross-culturally

	I = H>J*	I>H = J	I>H>J	H>I = J
A/SON	not display affection protect	ridicule manipulate	criticize	not compete with
ON/FA	not display affection protect help	deceive	attract attention	
A/DAU	not imitate	plead with	ridicule	not display affection
AU/FA	not imitate confide in protect concede to not compete with	defy display affection plead with manipulate		
O/SON	not imitate	criticize		not manipulat
ON/MO	not imitate	defy attract attention		not deceive
IS/SIS	imitate confide in	criticize compete with		not deceive
RO/BRO	imitate not display affection not console plead with confide in			not deceive
IS/BRO	plead with criticize protect manipulate	defy attract attention		not imitate not help
RO/SIS	defy ridicule console criticize confide in	compete with manipulate	attract attention	
IF/HUS	not imitate not corrupt		criticize	console not plead with
US/WIF	confide in attract attention of			not imitate not corrupt

TABLE 21 (Cont.)

O/MAN	not imitate cooperate with confide in compete with manipulate	display affection ridicule	help attract attention of	
IAN/WO	not imitate console confide in		display affection	not concede to
)LD/YG	console protect not keep distant help	corrupt	display affection	
:G/OLD	not console plead with confide in compete with	criticize		
'CH/STU	manipulate	criticize		
;TU/TCH	cooperate with manipulate	ridicule not protect	deceive criticize attract attention	console not plead with
)R/PAT	not display affection not cooperate with not deceive confide in			not ridicule
PAT/DR	not imitate deceive not plead with confide in concede to help			
EMP/EE	not display affection	criticize	not console	not defy not compete with
EE/EMP	not plead with	not help		not imitate
POL/CIT	not display affection console not concede to keep at a distance manipulate	criticize		imitate
CIT/POL	deceive hinder concede to keep at a distance	not cooperate with criticize attract attention		

TABLE 21 (Cont.)

IRL/GF	help			
OY/BF				not criticize not compete with
OST/GST	not plead with help	cooperate with compete with		
ST/HOST	cooperate with not plead with protect help	not imitate		
C/STR	cooperate with criticize compete with manipulate			help
R/LOC	defy imitate concede to compete with attract attention			confide in
BR/NBR	cooperate with confide in help	compete with manipulate		console
/COWK	console compete with manipulate		ridicule	
/CUST	not display affection deceive not plead with not protect not compete with help		hinder manipulate	not imitate
ST/SP	cooperate with not protect concede to not compete with attract attention			criticize confide in
T/LEAD	not plead with	not deceive		not imitate not corrupt not attract attention
-SK/L-SK	defy display affection attract attention	imitate		not manipulat

TABLE 21 (Cont.)

-SK/D-SK	display affection console confide in protect	corrupt attract attention	compete with	
-SK/D-SK	not attract attention			not defy not criticize
-SK/L-SK	protect attract attention	defy not display affection ridicule		
:R/OPP	defy hinder compete with not help manipulate		deceive	not keep distant

:olumn (1) does not include 29 cases of I = H J on to show respect for, displaying less for all roles except EE/EMP, PAT/DOC, WIF/HUS, CIT/POL, :U/TCH, DAU/FA, D-SK/L-SK, SON/MO, WK/COWK, L-SK/D-SK, and CIT/LEAD.

with, not manipulating and not displaying affection toward FATHERS (generally Initiating, Future-oriented and Ego-oriented behaviors). Note that we say NOT in this case because column 2 is oriented in terms of I being "greater than" H and J. Another example: Hawaiians are more like Illinoians in seeing STUDENTS as both cooperating with and manipulating TEACHERS, but they are more like Japanese in protecting and not ridiculing TEACHERS (column 2) as well as tending toward the Japanese in not deceiving, not criticizing, and not attracting the attention of TEACHERS (column 3). And a third example: Hawaiians are like Illinoians in seeing NEIGHBORS as cooperating with, confiding in and helping EACH OTHER; they are like the Japanese in seeing NEIGHBORS as not manipulating and not competing with EACH OTHER the way most Americans do!

Can we generalize about IPV usage across roles and see what features seem to be operating? The verbs which tend to appear in column 1 but not in columns 2 and 3 (i.e., behaviors shared by Illinoians and Hawaiians as against Japanese) are console, cooperate with, protect, show respect for and help; in terms of the a priori features, these verbs would be characterized as dominantly Moral, Associative, and Alter-oriented. Verbs having the reverse pattern of appearance (i.e., behaviors tending to be shared by the Hawaiians and Japanese as against the Illinoians) are ridicule, criticize, manipulate and attract attention; these verbs would be characterized as sharing Active, Deliberate, Terminal and Supraordinate features. In other words, these behaviors would seem to be aspects of American culture which the Hawaiians of Japanese ancestry have resisted taking over. Verbs which appear most frequently in colum- (i.e., behaviors

perhaps most uniquely characterizing the Hawaiian culture) are console, not imitate, not currupt, not deceive, not criticize and not compete with; the shared semantic features of this set are interesting -- Morally Associative and Alter-oriented like other behaviors Hawaiians share with Illinoians, more Passive like the Japanese, and distinctively Impulsive (rather than Deliberate).

The only role-pairs for which there are more differentiating verbs in columns 2 and 3 (Hawaiian/Japanese affinities) than in column 1 (Hawaiian/Illinoian affinities) are FATHER to SON, FATHER to DAUGHTER, SON to MOTHER, STUDENT to TEACHER, EMPLOYER to EMPLOYEE and DARK SKINNED PERSON to LIGHT SKINNED PERSON. In general, there are not enough differentiating verbs in the different categories for particular role-pairs to warrant interpretation. However, it is possible to collapse the role relations into certain components: Sex, Age, Status and Egalitarianism. The feature codings of the IPV's associated with each role-pair displaying a given component (e.g., MAN to WOMAN, + Sex) under each category (e.g., I = H>J) were tabulated and inspected for points of gross cultural difference.

Sex component. The +Sex role-pairs consisted of FATHER to DAUGHTER, SON to MOTHER, BROTHER to SISTER, HUSBAND to WIFE and MAN to WOMAN. Illinois (I) and Hawaiian (H) subjects agree, and differ from the Japanese (J), in the attribution of behaviors to males which are Supraordinate and Past-oriented; H and J agree, and differ from I, in having Males more often display Alter-oriented behaviors; I subjects depart from both H and J in having more Male behaviors that are simultaneously Ego and Future Oriented toward Females (pleading, defying, competing, manipulating). The -Sex role-pairs are the reverse of the

above, of course (DAUGHTER to FATHER, MOTHER to SON, etc.). Americans (H and I) differ from Japanese in having Females behave more Associatively but also more Supraordinately and Deliberately toward Males; H and J differ from I in having Females behave more Passively and Reactively toward Males.

Age component. The +Age role-pairs are FATHER to SON, FATHER to DAUGHTER, MOTHER to SON, OLD to YOUNG and TEACHER to STUDENT. Americans (I and H) differ from Japanese in seeing the Old as being more Potently and Supraordinately Alter-oriented toward the Young, whereas Illinoians differ from both H and J in the tendency to attribute behaviors to the Old which are more Actively Supraordinate (e.g., ridiculing, criticizing corrupting). Again, it should be kept in mind that these are all relative differences. For the -Age role-pairs (opposites of above), Americans see the Young as being more Initiating and Deliberate toward the Old, whereas H and J agree in seeing the Young as being more Impulsive and Interminal in their relations with the Old.

Status component. The +Status role-pairs include both professional and social relations: TEACHER to STUDENT, DOCTOR to PATIENT, EMPLOYER to EMPLOYEE, POLICEMAN to CITIZEN, CUSTOMER to SALESPERSON and (things being as they are) LIGHT SKINNED PERSON to DARK SKINNED PERSON. The only marked difference here is that Illinoian see High Status persons as being less Associative in their behaviors toward Low Status persons than the other cultures. This contrast is even more marked for the -Status role-pairs, with Illinoians tending to attribute behaviors to Low Status persons which are not only less Associative but also relatively more Active, Terminal and Supraordinate. Both American groups agree, and differ from the Japanese, in seeing Low Status people

as behaving more Deliberately (calculatedly?) with respect to High Status people.

Egalitarianism. This is treated as a uni-polar component. The role-pairs considered logically Egalitarian are SISTER to SISTER, BROTHER to BROTHER, GIRL to GIRL FRIEND, BOY to BOY FRIEND, NEIGHBOR to NEIGHBOR, WORKER to CO-WORKER, LIGHT SKINNED PERSON to LIGHT SKINNED PERSON and DARK SKINNED PERSON to DARK SKINNED PERSON. We have already noted in the Role factor analysis that Americans generally tend to attribute the most Egalitarianism to these parallel roles and Japanese the least. What about differences in the (English) a priori features of the verbs which distinguish the cultures for these role relations? Americans (I and H) differ from Japanese in seeing these role relations as more Moral, Active, Initiating and Ego-oriented (a more competitive Egalitarianism?); H and J agree on behaviors which are more Passive and Alter-oriented (a more cooperative Egalitarianism?); and Hawaiians stand out in attributing Morality (even more than their agreement with Illinoians), Associativeness and particularly Impulsiveness to these Egalitarian relations (not deceive, not criticize, not compete with, not manipulate, but console).

This exploratory study with a Role Differential was our first attempt to fuse semantic feature analysis with cross-cultural research on interpersonal norms. It was premature, in that we have still to validate and stabilize our analysis procedures and demonstrate generali of the features derived. It is probably best construed as a methodological demonstration of what might be done cross-culturally with better materials. Even within these limitations, I find the results very encouraging. The verb factors -- including For-1 Associative/

Dissociative, Intimate/Remote, Supraordinate/Subordinate and some fusion of Morality and Ego/Alter Orientation -- are very similar to those reported in related research by Triandis and his associates with American, Indian and Japanese cultures (Triandis, Shanmugam and Tanaka, 1966) and with American and Greek cultures (Triandis, Vassiliou and Nassiakou, 1968). These investigators have developed what they call a Behavioral Differential; it differs from the Role Differential, as used here, in that (a) many of the IPV's refer to observable behaviors (e.g., throw rocks at, go to movies with) rather than more abstract intentions and (b) there is no explicit selection of IPV's in terms of previously analysed semantic features.

Does analysis in terms of differences in semantic and "cultural" feature coding contribute in any way? Within the limitations noted earlier, many of the distinctions drawn are consistent with my own observations during a year in Hawaii and several visits to Japan. For examples: the greater and more competitive Egalitarianism (Active, Initiating and Ego-oriented) of American as compared with Japanese culture, including the American perception of low status individuals as more Dissociatively and Actively Supraordinate in their behavior toward High status individuals; the uniquely Hawaiian stress on Impulsive and Moral Associativeness among people, equals as well as unequals; the more Actively Supraordinate behaviors of older toward younger Americans, along with general acceptance by Americans (but not Hawaiians and Japanese) of more overtly aggressive behaviors toward others (e.g., criticizing, ridiculing, manipulating and the like); the greater Ego-orientation, Deliberateness and Supraordinateness of the American female toward the male -- this showing up particularly

in DAUGHTER to FATHER relations -- coupled with the American male's greater competitiveness with the female (Ego and Future-oriented); the more Passive, Impotent and Subordinate role of the Japanese student with respect to his teacher as compared with the more competitive American student.

Of course, casual observations on "national character" having the ink-blotish, projective nature they do, apparent consistency of these data with my own observationsdoesnot constitute very strong evidence. On the other hand, Triandis, Shanmugam and Tanaka (1966) also report on the relatively greater supraordinateness of the Japanese male and the American female, on the "greater importance of subordination and respect in the Japanese than in the American Behavioral Differential", and on the fact that "older people may not be liked, but they are respected" by the Japanese. The potential value of linking comparative studies of interpersonal norms to the (hopefully universal) semantics of interpersonal verbs is that this can provide a standardized stable and reasonably rigorous basis for the comparisons.

Appendix A

Instructions

We need your help in discovering certain things about the English language. Specifically, we want to know what you think of particular word combinations. For example, here are two words, attack and dynamically. Think of the meanings of each of these words. Now suppose we combine the two words to make the phrase, attack dynamically. What do you think of such a phrase in terms of the meanings of the wrods which make it up? Is it a combination of words that you would judge as particularly fitting, apt, and appropriate? Or is it one that you would judge as inappropriate, ridiculous or even impossible? Perhaps you may feel that this combination of words is merely permissible, satisfactory, and acceptable -- that is, neither particularly apt nor really inappropriate.

We want you to judge the verb-adverb combinations on the next six pages in terms of their ordinary uses in English. Each combination is followed by a choice: plus (+), zero (0), or minus (-).

If you, as a native speaker of English, think that the combination is particularly apt, fitting, appropriate, then you should circle the plus (+).

FOR EXAMPLE:

attack violently ⊕ 0 -

If you, as a native speaker of English, think that the combination is permissible, satisfactory, acceptable (yet not particularly apt or fitting), then you should circle the zero (0).

FOR EXAMPLE:

attack stupidly + (0) -

If you, as a native speaker of English, think that the combination is inappropriate, impossible, ridiculous in terms of the meanings of English words, then you should circle the minus (-).

FOR EXAMPLE:

attack meekly + 0 (-)

You must keep one thing in mind: we are not interested in how frequent (or infrequent) or how familiar (or unfamiliar) a particular combination is. For example, you have probably never heard or said attack dynamically, yet it may seem completely fitting, when you see it (and therefore it is a +). On the other hand, there are some fashionable metaphors, like think concretely, which are literally inappropriate in terms of our language (and should be udged -). Make your judgments in terms of the literal meanings of the words, not in terms of what may be familiar or poetic.

Most combinations will strike you immediately as perfectly appropriate, permissible, or inappropraite. In this case, indicate your immediate impression by circling. A few combinations will puzzle and perhaps intrigue you, like love flippantly; in these

cases it may help to think of a complete sentence,

e.g., HE loved HER flippantly.

and judge that -- can one <u>love</u> someone <u>flippantly</u>, as words should be used in English?

Well -- have fun, and many thanks for your help.

Charles E. Osgood

Critical Summary

As I observe early in this paper, what is the appropriate method of analysis of a semantic domain depends upon how that domain is "in truth" organized. One of the difficulties of research in this area is that we do not know on a priori grounds how particular domains are arranged -- and worse, we have good reasons to suspect that different domains are quite differently and even inconsistently arranged. To get an idea of at least some of the possibilities, observe the five "types" of possible semantic systems described in Figure 11. Only three variables are treated here: nested vs. replicated features, ordered vs. unordered features, and independent vs. dependent (or contingent) features. Many other variables could have been considered, -- unipolar vs. bipolar feature systems (items being marked or unmarked rather than + or -), binary vs. trinary, vs. continuous feature systems, and so forth.

The Type I system (nested, ordered, independent) is called a "taxonomic hierarchy" I believe. It is the only nested system given,

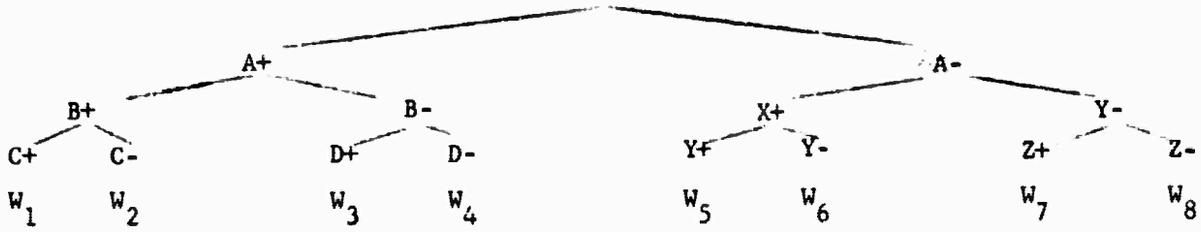
FIGURE 11 ABOUT HERE

because nesting presupposes both hierarchical ordering and independence of features (since either B+ or B- can only occur when A is +, B cannot be correlated with A). This is the most constrained system. Only when the higher-order feature has been determined does it make sense to ask about any lower-order feature; only when a term is marked as Concrete (rathe. than Abstract) does it make sense to ask if it is Animate or Inanimate, only when it has been marked Animate does it make sense to ask if it is Animal or Vegetable, and so forth down the nested hierarchy. Furthermore, each distinguishi- ature appears

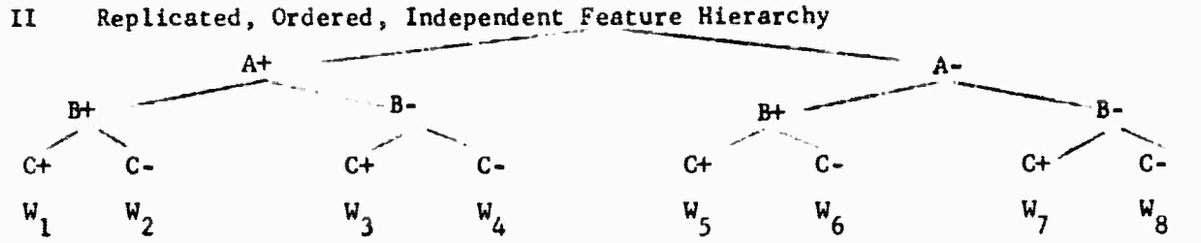
FIGURE 11

Some Types of Semantic Systems

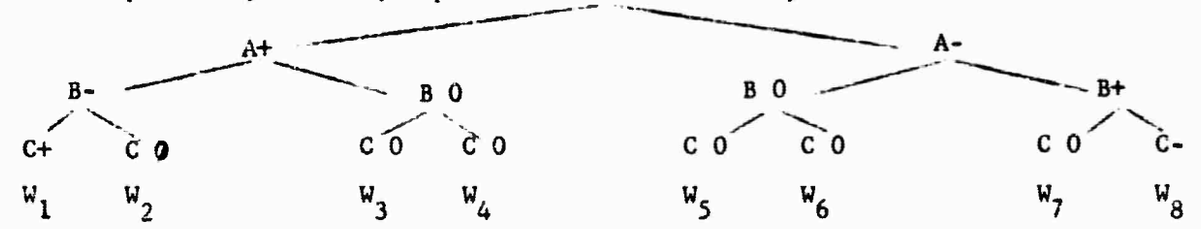
I Nested, Ordered, Independent Feature Hierarchy



II Replicated, Ordered, Independent Feature Hierarchy



III Replicated, Ordered, Dependent Feature Hierarchy



IV Replicated, Unordered, Independent Feature Matrix

	W_1	W_2	W_3	W_4	W_5	W_6	W_7	W_8
FA	+	+	+	+	-	-	-	-
FB	+	-	+	-	+	-	+	-
FC	+	+	-	-	+	+	-	-

V Replicated, Unordered, Dependent Feature Matrix

	W_1	W_2	W_3	W_4	W_5	W_6	W_7	W_8
FA	+	+	+	0	0	-	-	-
FB	+	+	0	+	-	0	-	-
FC	+	0	-	+	-	+	0	-

only once in the system, e.g., Animal/Vegetable cannot appear anywhere under the nodes marked Abstract or Inanimate. It is also characteristic of such systems that all supraordinate categories must be marked 0 on all of the features of its nested subordinate categories; ANIMAL must be marked 0 on Vertebrate/Invertebrate, Human/Non-human, Male/Female and so forth, even though it is reasonable to ask if an animal is Vertebrate or Invertebrate. etc.

In a recent paper elaborating and testing a theory of sorting, George Miller (1968) concludes that his free-sorting discovery procedure (cf., pp. here) is ideally suited to semantic systems of this nesting type, but that multidimensional scaling procedures are more appropriate for what he calls "paradigmatic" organizations (Type IV here). His free sorting procedure proves to be reasonably successful with nouns but not with verbs. The system for Thai pronouns also seems to approximate this arrangement (see Figure 10 here). However, even within the taxonomic system for nouns used as an example above, inconsistencies appear below the node marked Human (vs. Non-human): although a Married/Single feature is nested within Mature (as apposed to Immature), Mature/Immature can be asked sensibly about either Male or Female and vice versa, so both nesting and hierarchical ordering principles are violated.

In Type II systems (replicated, ordered, independent) each semantic feature is applicable to all terms (W_1 through W_8 in the diagrams), but the order in which decisions are made must be maintained. In the pure or ideal case, it would be absurd to ask if a word is B+ or B- before deciding whether it is A+ or A-. In a sensitive intuitive analysis, Vendler (1967, Ch. 4) derives a two-feature system of this

type for English verbs with respect to the time dimension. The supraordinate feature is Action vs. State: one can say significantly I am PUSHING it (Action verb), but it is strange to say I am KNOWING it (State verb); conversely, one can answer the question Do you KNOW . . ? sensibly by saying I do, but there seems to be no sensible answer to the question Do you PUSH . . ? The subordinate feature is Terminal vs Interminal (my terms, not Vendler's): one can reasonably ask How long did it take to DRESS? (Terminal Action verb) but not really For how long did you DRESS? and conversely for PUSH (an Interminal Action verb); similarly, one can ask At what time did you MEET the girl? (Terminal State verb) but not really For how long did you MEET the girl?, and conversely for KNOW (an Interminal State verb). Although there are some fuzzy verbs and some verbs with fuzzy edges (by virtue of having several senses), as Vendler acknowledges, these features seem necessary, if not sufficient, for the semantic characterization of verbs-in-general.[58] Vendler refers to the four verb

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[58] In asking these questions of a sample of 40 of our interpersonal verbs, I find a nearly perfect correlation of Vendler's Action vs. State with our Active/Passive feature and of his Definite (the time stretch or instant) vs. Indefinite (a or any time stretch) with our Terminal/Interminal feature.

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categories established by these features as "Activities" (Interminal Actions), "Accomplishments" (Terminal Actions), "Achievements" (Terminal States) and "States" (Interminal States). Note that one

cannot decide on the appropriate Terminal/Interminal questions until he has answered the Action/State question -- hence the ordered, hierarchical nature of the system.

In "pure" systems of Types I and II, the basis of ordering is logical inclusion. However, there may also be ordering on the basis of psychological salience, and the latter clearly plays some role in the semantics of interpersonal verbs. Throughout the analyses reported in this chapter the Associative/Dissociative feature has been the dominant mode for characterizing interpersonal verbs, this typically being followed by Supraordinate/Subordinate and Ego-orientation/Alter-orientation. The other features, to the extent that they appear at all -- Morality, Dynamism, Terminality, Time-orientation and the like -- seem to merely refine the basic semantic categories already established. What is not clear is the performance implications of psychological salience as compared with logical inclusion. Whereas "inclusion" would definitely imply temporal ordering of decisions, "salience" could merely imply differences in the weights or generalities of features.

The Type III sementic system shown in Figure 11 (replicated, ordered, dependent) differs from Type II in that the features are not independent of each other. To illustrate the situation as diagrammed, an interpersonal verb must be Associative (+A) if it is to be Subordinate (-B) and Dissociative (-A) if it is to be Supraordinate (+B), and it must be both Associative and Subordinate (+A, -B) if it is to be Moral (+C) or both Dissociative and Supraordinate (-A, +B) if it is to be Immoral (-C). This situation is approximated by our data, but only approximated, eg., IPV Seduce is Supraordinate and Immoral but not Dissociative and IPV Defy is clearly Dissociative but neither

Supraordinate nor Immoral. Note that this kind of system, in its extreme form, resembles the nested hierarchy, but the "limbs" of subordinate features are bifurcated, separated, within the tree. Any correlational discovery procedure will tend to fuse such dependent features into single factors -- in the present case, an Associative-Subordinate-Moral vs. Dissociative-Supraordinate-Immoral factor. Yet, logically speaking, three distinct features are operating, the lower ones in the hierarchy serving to further distinguish terms already grossly distinguished by the higher features.

If a semantic system is unordered, then any "tree" diagram is inappropriate -- both arbitrary and misleading. Rather, the system must be represented by a feature-by-term matrix or, equivalently, by an n-dimensional spatial model, in which the features are dimensions and the terms are locations. In the Type IV semantic system (replicated unordered, independent), the features are uncorrelated and the dimensions are orthogonal; in the Type V system (replicated, unordered, dependent), the features are correlated and the dimensions are oblique with respect to each other. For simplicity in exposition, in the diagrams in Figure 11 I have assumed discreteness in coding, although I am sure this is not the general situation in semantics -- a simplistic system toward which behavioral principles may tend but only occasionally reach. It should be noted that my own representational mediation theory of meaning -- in which the meaning of a sign is that simultaneous "bundle" of distinctive mediating reaction components elicited by the sign, termed its r_m -- implies such an unordered system, although it does not rule out differences in salience and does not make any assumptions about discrete vs. continuous coding.

Pure Type IV systems (features independent) seem to be rare in semantics -- at least, I cannot think of any. I believe the Turkish vowel phonemic system is of this type; three distinctive phonetic features (tongue high/tongue low, tongue front/tongue back, lips rounded/lips flat) generate a complete eight-phoneme system, neatly representable as the corners of a cube. Our affective E-P-A (Evaluation Potency, Activity) system approximates this, but E has much more weight than P and A. Kinship systems ("paradigmatic" according to Miller, 1968) approximate Type IV, but again usually imperfectly. The American English kinship system, for example, is unordered, in the sense that questions about Sex (Male/Female) seem to have no logical priority over questions about Generation (+Ego, 0 Ego, -Ego) or Consanguinity (Blood-related/Blood-non-related), and it is replicated, in the sense that one may ask about the Sex of any Generationally defined member (and vice versa), about the Generation of any Consanguinally defined member (and vice versa), and so on. But questions about Lineality ("Is X in my lineage or not? My <u>mother</u> is but my <u>aunt</u> is not.") only make sense when Consanguinity has already been determined to be positive. Therefore this kinship system is partially nested, and hence neither perfectly unordered nor perfectly replicated.

The Type V system (features to various degrees dependent or correlated) probably holds for many semantic systems, and it greatly complicates empirical discovery procedures. Features A and B, as distributed in Figure 11 (V), are highly correlated, as are features B and C, but negatively; features A and C, on the other hand, are independent (zero correlation). Only an oblique factor analysis (or feature analysis) would "discover" the three underlying features, and

oblique analyses are difficult to interpret in my experience. The results of all of our studies suggest this Type V system -- with "fused" rather than independent features -- but nothing readily interpretable has emerged from oblique factor analyses. However, the data also clearly imply a system partially ordered in terms of the psychological salience of the features. In sum, it would appear that the semantic system for interpersonal verbs (1) is not nested, (2) is partially replicated (features applying to all terms only when zero codings are allowed), (3) is partially ordered (but in terms of psychological salience rather than logical inclusion), and (4) is partially dependent (with features correlated in usage to various degrees). This is obviously not the neatest kind of system to study.

Not only is a particular empirical discovery procedure appropriate to a semantic domain of a particular type, but when it is applied to a domain of a different type it will tend to force the data toward correspondence with the system for which it is appropriate. Fortunately our intuitions as native speakers enable us to note the absurdities which must result. Thus when Miller's free sorting procedure was applied to verbs it presumably yielded a "nested" system, but not apparently an intuitively satisfying one; he does not present these results because, as he says (1967), "I do not yet understand them." And thus when our factor and feature analytic procedures, which are most appropriate for a pure Type IV paradigmatic system, are applied, they yield independent factors all right, but when these are compared with the a priori features it becomes clear that the semantic system of interpersonal verbs is not of this straightforward type either.

The resolution is at once obvious and complicated: restrict

the semantic domain under study to a pure type of system and then apply the appropriate discovery procedure. If the domain is even partially ordered by logical inclusion (Types I, II,and III), then one must ask first questions first a la Kindler and thereby divide the domain into sub-domains, all of which are at the same hierarchical level and each of which contains terms with the same supraordinate features. If these sub-domains do include more than one term, and they are not synonymous (which seems most likely for the major form classes), then multivariate procedures of the sort we have employed should be appropriate for the discovery of finer semantic feature distinctions. In part, this is what we did by restricting our domain to interpersonal verbs -- a sub-domain of verbs defined by the sharing of certain higher-order features.

Working in the domain of adjectives, and applying the three-mode factoring method developed by Ledyard Tucker (1966), John Limber[59] has made such a serial approach explicit. The three modes were sentence

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[59] Semantic categorization of English adjectives in terms of usage. Doctoral dissertation, University of Illinois, August, 1968.

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frames (N = 10), nouns (N = 10) and adjectives (N = 50). The sentence frames were deliberately selected to differentiate the major types of adjectives in terms of syntactic derivation, e.g.,

(1) The N that they did it was A.

(2) It was A of the N to do it.

(3) The N was A about something.

The nouns were deliberately selected to represent many semantic

categories, e.g., MAN, HORSE, TEAM, TREE, COMPUTER, PEBBLE, FACT. Simple acceptability judgments of each of the 5,000 possible combinatior (The fact that they did it was obvious, The computer that they did it was happy, and so for h) and their latencies were obtained. Three frame factors account for a large share of the variance, and these do seem to tap higher-order semantic features. Frames (2) and (3) above, for example, both load on a factor requiring Animate subjects -- for most speakers, it was absurd to say It was A of the (TREE, FACT, GRAVITY -- but not COMPUTER) to do it -- but frame (3) accepts mental state adjectives (like happy) whereas frame (2) does not. However, within frames which accept particular nouns (with certain adjectives) and particular adjectives (with certain nouns), it is apparent that semantic interactions between these nouns and adjectives serve to further differentiate them. The HORSE was HAPPY about something and The MAN was STRICT about something are both acceptable, but The HORSE was STRICT about something is clearly absurd. By analysis of usage distributions within the sub-domains defined by such sentence frames it would seem possible to get at lower-level semantic features. The problem, of course, is to select those frames ("questions") which reliably differentiate higher-order features and have complete generality of application across the domain in question. Limber was guided in his selections by a great deal of prior linguistic spade-work.

Similar spade-work will be required in the domain of interpersonal verbs, and much of it has been done for verbs-in-general by linguists and philosophers of ordinary language, as exemplified by Vendler (1967) and Fillmore (1967). The features distinguished obviously relate to what is now referred to as the "deep" structure of the

syntactic component, and I wonder how long it will be before the deep structure of the syntactic component and the semantic component become inentified as the same thing. Fillmore seems to be thinking along similar lines when he includes among his "closing words" the following statement (p. 110): "If it is possible to discover a semantically justified universal syntactic theory along the lines I have been suggesting; if it is possible by rules, beginning, possibly, with those which assign sequential order to the underlying representations, to map these 'semantic deep structures' into the surface forms[60] of

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[60] Precisely such a sequentially ordered scanning of a hierarchically ordered semantic system has been suggested by James E. Martin as an explanation of pre-nominal adjective ordering in the surface structure of English in his doctoral dissertation: A study of the determinants of preferred adjective order in English. University of Illinois, July, 1968.

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sentences; then it is likely that the 'syntactic deep structure' of the type that has been made familiar from the work of Chomsky and others is going to go the way of the phoneme." There is also a question as to whether the universals we have been discovering, certainly in the domain of affect and apparently as well in the domain of interpersonal behavior as reflected in language, are properly to be considered a part of Semantics or a part of Pragmatics. But questions like these go far beyond the scope of this paper, intended to be primarily methodological in nature.

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13. ABSTRACT

This report provides a summary of the research to date on the semantics of interpersonal verbs and the applications of the information obtained to cross-cultural studies of interpersonal norms and behaviors. More detailed Technical Reports and publications of particular studies have been prepared or are in preparation.

A theory of interpersonal perception and behavior in relation to the meansings of interpersonal verbs in the language is presented. Intuitive and empirical approaches to the discovery of semantic features are contrasted. The potential powers and limitations of empirical methods are illustrated by a review of the semantic differential technique. The results of an intuitive, a priori analysis of the semantic features of some 200 interpersonal verbs are summarized (cf., Technical Report No. 39); the 10 semantic features derived from this analysis serve as one criterion for the success of empirical procedures being developed. A new empirical approach, called semantic interaction technique--essentially, using the rules of usage of words in syntactic combination as the basis for inferring the semantic features of the words thus combined--is described, along with a preliminary theory of the dynamics of semantic interaction. Two measurement models of semantic organization--the familiar factor analytic model (continuous) and a new semantic feature model (discrete) --are tested against empirical data on judgments of interpersonal-verb/adverb combinations, with encouraging results. A variety of validation checks on the features derived--including a semantic word game, feature scaling, feature satiation and word-finding tests--are described. Finally, several cross-cultural, cross-linguistic studies are reported, including a comparison of Japanese with American English interpersonal-verb/advert intersection results, a study of the features of Thai interpersonal pronouns, and a comparison of Japanese-in-Japan vs. Hawaiians-of-Japanese-ancestry vs. American-English-in-Illinois on a new form of Role Differential based upon the semantic studies of interpersonal verbs.

KEY WORDS:

Semantics of interpersonal verbs
norms of interpersonal behavior
semantic interaction technique
semantic features
role differential
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