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Author(s): Linda Coleman and Paul Kay

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## PROTOTYPE SEMANTICS: THE ENGLISH WORD *LIE*

LINDA COLEMAN and PAUL KAY

*University of California, Berkeley*

The meaning of the word *lie* ('prevaricate') consists in a cognitive prototype to which various real or imagined events may correspond in varying degrees. This view contrasts with the familiar one in which word meanings consist of sets of necessary and sufficient conditions, and distinguish discretely between instances and non-instances. The relevance of the notions of PROTOTYPE and GRADIENCE in semantics has previously been established in physical and sensory lexical domains. The present paper shows that these notions are also relevant in abstract and social domains. Results are reported from an experiment which supports this view.\*

Received notions of word meaning in linguistics are based on the idea of the semantic feature or component:<sup>1</sup> semantic features are discrete properties (or relations), and they contrast discretely with one another. The meaning of a word is represented as a set of features, possibly with a single member. Variations on this standard theme differ in that some see the SET of discretely contrasting features as having no further structure (as in, the writings of anthropological semanticists such as Wallace & Atkins 1960, in Chomsky 1965:214, and in the earlier writings of Jerrold Katz), while others believe that additional (e.g. treelike) structure is imposed (cf. Weinreich 1966, Katz's later writings, or Leech 1974:149 ff.) We are not concerned here with these sub-variations within the generally accepted theory of discretely contrasting semantic components, since we intend to challenge the very notion of the discrete semantic feature.

The ensemble of theories built upon this fundamental notion have been aptly characterized by Fillmore 1975 as CHECKLIST theories.<sup>2</sup> Since the simplest case of such a theory is that in which no additional structure is imposed on the set of discretely contrasting features, it will suffice to show that, even in this simplest form, the checklist theory is inferior to our approach in accounting for the kind of cases that have been selected to exemplify it. (A similar demonstration in the case of color vocabulary is given by Kay & McDaniel 1978.)

According to the checklist view, the definition of a semantically complex word (or sometimes a single 'sense' of such a word) consists of a set of features or components such that a given object (physical or otherwise) is aptly labeled by the word just when it possesses the property named by each feature in the definition. The list of features amounts to a set of necessary and sufficient conditions which a thing must satisfy in order to be an instance of the category

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<sup>1</sup> When we speak of a 'semantic component' in this paper, we never intend it in the sense of a 'semantic section of a grammar'

<sup>2</sup> See Fillmore's article for a seminal discussion of the prototype concept in linguistics, and for references to the earlier literature in a number of fields. Black (1954:24-5) develops a very similar view.

labeled by the word. Applicability of a word or other linguistic label to a thing is thus a matter of 'yes or no', not of 'more or less.' Either the thing satisfies the list of necessary and sufficient conditions, or it does not. No partial fit of word to object is countenanced.

By contrast, our PROTOTYPE view of word meaning attempts to account for the obvious pretheoretical intuition that semantic categories frequently have blurry edges and allow degrees of membership. On this view, applicability of a word to a thing is in general NOT a matter of 'yes or no', but rather of 'more or less'. This has been shown experimentally in the domain of color (e.g. Berlin & Kay 1969, Kay & McDaniel 1978) and in several other lexical domains (Kempson 1977, Rosch 1975, Labov 1973). It has also been supported by a variety of linguistic arguments; cf. Kay 1978, Fillmore 1975, and Lakoff 1972. In the philosophy of language, Putnam has recently (1975:132 ff. et passim) advocated a view in which word meanings are determined in part by 'stereotypes', a position with antecedents in Black. Mathematicians such as Zadeh 1965 have developed a theory of 'fuzzy' sets to model such phenomena formally.

Previous experimental investigations of semantic prototypes have dealt exclusively with directly perceptible physical objects or with perceptual sensations themselves, e.g. colors, plants and animals, utensils, and furniture. The present study attempts to show that the prototype phenomenon is also to be found in the semantics of words referring to less concrete things—in this case, a type of speech act, namely lies. We do not attempt to give a general formulation of the concept 'semantic prototype' to cover all relevant cases, e.g. color terms, natural kinds, or speech acts. In our present state of ignorance, it seems preferable to settle initially for a loose characterization of the prototype concept. Let us say, roughly, that a semantic prototype associates a word or phrase with a prelinguistic, cognitive schema or image; and that speakers are equipped with an ability to judge the degree to which an object (or, if you prefer, the internal representation thereof) matches this prototype schema or image.<sup>3</sup>

The particular prototype schema which we propose for *lie* has the following (semi)formal characteristics:

(a) It contains a finite list of properties. In this respect it is like a checklist definition, but in other respects it is not.

(b) The individual properties on the list are each treated as dichotomous, i.e. as either satisfied or not. We envisage, however, that prototype schemata may in general contain gradient properties, whose satisfaction is a matter of degree. We leave open the possibility that an investigation conducted at a more detailed empirical level might find this to be true with *lie*.

(c) Membership in the category *lie* is a gradient phenomenon.

(d) Satisfaction of each property on the list contributes to the over-all degree of membership of an individual in the category.

(e) Satisfaction of each property on the list does NOT necessarily contribute

<sup>3</sup> It has been argued elsewhere (Kay 1978:81) that 'virtually any sort of formal structure that is readily apprehended by the human mind may serve as such a cognitive schema.'

EQUALLY to the degree of membership of an individual in the category. That is, properties may be of differential importance in constituting the prototype.

(f) In this gradient framework, the bivalent concepts of the 'necessity' and 'sufficiency' of properties do not apply.

1. PROTOTYPE ANALYSIS OF *LIE*. When we try to define *lie*, the first thing that comes to mind is probably the idea of saying something untrue. This, however, is not adequate, since people frequently say things that are not true but which nonetheless are not called lies—e.g. when the speaker is sincerely trying to convey what he believes to be true information. Honest mistakes and innocent misrepresentations occur frequently, and are not labeled lies. Thus we need a second element in the definition of *lie*, which is that the speaker believes that what he is saying is false.

This, however, still leaves a large number of utterances which we would not want to call lies, even though they are not true. For example, cases of metaphorical speech (*He's a pig*), sarcasm (*You're a real genius, all right!*), and hyperbole (*It's so hot out there, you could fry an egg on the sidewalk*) differ from cases of lying in that the speaker is not trying to induce the hearer to believe something which is not true. Hence a third property of the definition of lying is that the speaker intends to deceive the hearer.

This gives us the following definition of a 'good' lie, where the speaker (S) asserts some proposition (P) to an addressee (A):

- (1) a. P is false.
- b. S believes P to be false.
- c. In uttering P, S intends to deceive A.

The prototypical lie, then, is characterized by (a) falsehood, which is (b) deliberate and (c) intended to deceive.<sup>4</sup>

The notion of prototype definition suggests that utterances which have all three of the elements above would be considered full-fledged lies, and that utterances which lack one or more of the elements might still be classed as lies, but less clearly so; we might expect disagreement among S's as to their classification, and uncertainty on the part of individual S's.<sup>5</sup> Most of the ex-

<sup>4</sup> We do not suggest that we have expressed these prototype elements in terms of semantically elementary notions. For example, *deceive* is no doubt itself semantically complex—containing (among other, more obvious ideas) something to the effect that the act in question has non-trivial human consequences. Suppose you are reading off the population of a city from a newspaper and, mistaking one token of the numeral '3' for '8', report the population to be 8,000,008. If the true population is 3,000,008, it is fair to say that you have deceived us (albeit inadvertently); but if the true population is 8,000,003, it isn't fair to say you have deceived us at all. The 'non-trivial-human-consequences' property of *deceive* no doubt carries over into the use of *lie*, and is discussed further below.

<sup>5</sup> Henceforth we will speak of 'elements' or 'prototype elements', rather than 'features'. We avoid 'feature' to escape the implication that the properties in question are necessarily to be applied to prospective members of a category in an all-or-none fashion, as well as the implication that the internal structure of a semantic prototype—the web of relations among the elements—is limited to any of the kinds of relations among 'semantic features' that have been posited by theorists using that concept. Further, we wish studiously to avoid any commitment to some form of parallelism between semantics and phonology such as often accompanies the use of the term 'feature' in semantic researches—sometimes explicitly, sometimes implicitly.

amples above might not be classed as lies of any sort, although they contain one or more of the elements in 1a–c; however, utterances exist which are more likely candidates for classification as lies.

For example, the standard social lie is frequently uttered in situations where it might be true; A has no way of knowing. However, it is also frequently uttered when A knows quite well that the statement is false. Almost any situation in which politeness requires some sort of remark may produce a social lie:

- (2) a. What a lovely party!
- b. The dinner was very good.
- c. Oh, you wrote that paper on lying? I found it extremely interesting.
- d. How nice to see you!
- e. Drop in any time.

To fill such a social slot, S need not try to deceive A. However, the other two elements are present: S does not believe what he is saying, and the statement is in fact false. Some readers will, upon reflection, decide that what we call social lies, e.g. 2a–e, are not really lies to their way of thinking; others will disagree; and still others perhaps will find the question difficult to decide. This sort of interpersonal variation, coupled with intrapersonal uncertainty regarding the applicability of a word to (a class of) real-world events, appears characteristic of cases in which some prototype elements are present and some absent.

One also finds cases in which what is stated is literally true, but in which S intends to deceive. For example, if Mary is leaving the house to buy John's Christmas present, and John asks her where she is going, she might reply:

- (3) Oh, Shod's is having a sale on shoes and mine are worn out.
- (4) We're out of paprika.
- (5) To the store.

It might be perfectly true that Shod's is having a sale on shoes and that hers are in fact worn out. However, in uttering 3, she intends John to infer that she is going to buy shoes, which is not true. Although for some people, the unmodified word *store* may mean primarily the grocery store, in 5 Mary is, again, not saying anything that is, strictly speaking, untrue. Many people classify these as lies, but others don't; they actually fulfill only condition 1c, S's intent to deceive. This sort of deception by means of truth is frequently used by people who wish to protect themselves from subsequent accusations of having lied—or so our subjects tell us.

It appears, then, that S's use the word *lie* in such a way as to indicate its cognitive representation by a prototype. It seems obvious that, e.g., a 'social lie' that deceives no one is less of a lie than a full-fledged, intentionally deceptive falsehood; similarly for an intentionally deceptive but literally true statement, or for an innocent misrepresentation. However, things which are intuitively obvious sometimes turn out to be untrue, so we report here an experiment conducted to evaluate the hypothesis that the meaning of *lie* is based on the PROTOTYPE comprising the elements 1a–c.

2. THE EXPERIMENT. Given the three elements in 1a–c, each of which may be present or absent, the total number of possible configurations is eight. We constructed a questionnaire containing eight stories, each of which had a different configuration of the three elements.<sup>6</sup> Each story had an utterance in quotation marks which subjects were asked to rate as follows:

(6) It was {a lie / not a lie / I can't say}. I am {very sure / fairly sure / not too sure} most others would agree with the choice I just circled.

The rationale for this particular scoring system was as follows. We wished to obtain a scale of 'degree of lie' or 'degree of informant's certainty that the story contains a lie'. In a pilot test we had given the instruction:

(7) It was {a lie / not a lie / I can't say}. I am {very sure / fairly sure / not too sure} OF THIS JUDGMENT [emphasis supplied here].

We found in the pre-test that subjects tended to circle 'very sure' even when they were not sure at all—as judged by long hesitations, mumbling, furrowed brows etc. We considered using response time as a measure of uncertainty—but had to reject the idea, since response time would be virtually meaningless with stimuli of this complexity; e.g., it would have been impossible to control for reading speed. The scoring system which we finally adopted (that in 6) seems essentially to tap what was desired: the strength of the subject's conviction that the story reports a lie (or non-lie). However, we do not wish to convey the impression that adoption of this scoring system eliminated all methodological problems. Any attempt to do objective research with complex stimuli of this sort is bound to be fraught with problems of measurement and interpretation, several of which are discussed below.

The scoring system adopted yields a numerical judgment, for each subject's rating of each story, on a seven-point scale from 1 (very sure non-lie) to 7 (very sure lie), as indicated in Figure 1.

SUBJECT CIRCLES:	not a lie			can't say	lie		
SCALE SCORE:	1	2	3	4	5	6	7
SUBJECT CIRCLES:	very sure	fairly sure	not too sure	(anything)	not too sure	fairly sure	very sure

FIGURE 1.

We cannot be certain, a-priori, that any of the mathematical properties of this scale, beyond that of order, correspond to psychological reality. But there is reason to believe that the scale is valid at the level of ordinality; the simplicity and naturalness of the scoring instructions give face validity, and the clear

<sup>6</sup> If the reasonable view is taken that the individual prototype elements are themselves gradient, then our stimulus stories may be interpreted as containing fairly extreme positive or negative DEGREES of satisfaction of prototype elements. Hence our references below to elements as 'present' or 'absent' in a story may be interpreted as 'present absolutely or to a very high degree' and 'absent absolutely, or present only to a very low degree', respectively. The +/- notation to be introduced below should, of course, be interpreted accordingly.

pattern of results discussed below suggests that the relative magnitudes of scale scores represent real psychological distinctions.

The scoring sheet also included, after each story, a space for the subject's comments and an instruction requesting them. The questionnaire was given to 71 people, of whom about 50 were students, faculty, or staff at Berkeley. The rest were obtained through chance contacts of the investigators. No particular attempt was made to sample any nameable group except native speakers of American English. The age spread was from 15 to 72 years, and the sexes were about equally represented. Stories I–II were used as control questions: the first is an ordinary lie containing all three elements, 1a–c, while the second is an ordinary true statement, containing none of the elements of the lie prototype definition. Questionnaire results from subjects who answered either of these questions wrong were discarded. While no subject scored story I as anything other than a lie, three informants scored II as a lie—probably from inattention, to judge from their comments and performance on the rest of the questionnaire. The results from these three subjects were discarded as planned. One additional questionnaire was returned incomplete and was therefore discarded, leaving 67 completed questionnaires as the data base for this study.

The following stories made up the questionnaire:

(I) Moe has eaten the cake Juliet was intending to serve to company. Juliet asks Moe, 'Did you eat the cake?' Moe says, 'No.' Did Moe lie?

(II) Dick, John, and H.R. are playing golf. H.R. steps on Dick's ball. When Dick arrives and sees his ball mashed into the turf, he says, 'John, did you step on my ball?' John replies, 'No, H.R. did it.' Did John lie?

(III) Pigfat believes he has to pass the candy store to get to the pool hall, but he is wrong about this because the candy store has moved. Pigfat's mother doesn't approve of pool. As he is going out the door intending to go to the pool hall, Pigfat's mother asks him where he is going. He says, 'I am going by the candy store.' Did Pigfat lie?

(IV) One morning Katerina has an arithmetic test she hasn't studied for, and so she doesn't want to go to school. She says to her mother, 'I'm sick.' Her mother takes her temperature, and it turns out to Katerina's surprise that she really is sick, later that day developing the measles. Did Katerina lie?

(V) Schmallowitz is invited to dinner at his boss's house. After a dismal evening enjoyed by no one, Schmallowitz says to his hostess, 'Thanks, it was a terrific party.' Schmallowitz doesn't believe it was a terrific party, and he really isn't trying to convince anyone he had a good time, but is just concerned to say something nice to his boss's wife, regardless of the fact that he doesn't expect her to believe it. Did Schmallowitz lie?

(VI) John and Mary have recently started going together. Valentino is Mary's ex-boyfriend. One evening John asks Mary, 'Have you seen Valentino this week?' Mary answers, 'Valentino's been sick with mononucleosis for the past two weeks.' Valentino has in fact been sick with mononucleosis for the past two weeks, but it is also the case that Mary had a date with Valentino the night before. Did Mary lie?

(VII) Two patients are waiting to be wheeled into the operating room. The doctor points to one and says, 'Is Jones here the appendectomy or the tonsillectomy?' Nurse Braine has just read the charts. Although she is anxious to keep her job, she has nevertheless confused the charts in her mind and replies, 'The appendectomy,' when in fact poor Jones is the one scheduled for tonsillectomy. Did Nurse Braine lie?

(VIII) Superfan has got tickets for the championship game and is very proud of them. He shows them to his boss, who says, 'Listen, Superfan, any day you don't come to work, you better have a better excuse than that.' Superfan says, 'I will.' On the day of the game, Superfan calls in and says, 'I can't come to work today, Boss, because I'm sick.' Ironically, Superfan doesn't get to go

to the game because the slight stomach ache he felt on arising turns out to be ptomaine poisoning. So Superfan was really sick when he said he was. Did Superfan lie?

In the interest of simplicity, we will discuss the Stories III–VIII out of order. Story VII presents a situation frequently termed an honest mistake. Nurse Braine believes that what she says is true, and is not trying to deceive anyone by saying it; nevertheless, her statement is untrue. Thus VII has element 1a, but not 1b–c.

In Story VI, again, only one element is present—1c, intent to deceive.

In Story V, we have a relatively standard social lie, with two elements present—the falseness of P, and S’s knowledge that what he is saying is false (1a–b). However, since S intends to deceive no one, 1c is absent.

Stories V–VII represent situations which are often encountered in real life. It is more difficult, however, to concoct plausible situations which produce the other combinations of elements. Thus, in Story IV, S intends to deceive by saying what she believes to be a prototypical lie—but her statement turns out to be true (elements 1b–c only).

In Story III, the situation is again rather unusual. S is presumably attempting to produce the same sort of situation as in Story VI, in which he says something deceptive, but true. However, the needed configuration requires that, unknown to S, his statement is false. This gives us the perhaps infrequent situation of S saying something which he believes to be true, but with intent to deceive—and which happens to be untrue in fact (elements 1a–c).

Finally, in VIII, a situation exists in which the only element is S’s belief that his statement is false. It is rare that S says something he believes to be false but which turns out to be true; but it is rarer yet when this situation is complicated by a lack of intent to deceive in making the false statement (element 1b only). Table 1 summarizes the elements in each story.

STORY	P IS FALSE	S BELIEVES P IS FALSE	S INTENDS TO DECEIVE
I. (Moe)	+	+	+
II. (John)	–	–	–
III. (Pigfat)	+	–	+
IV. (Katerina)	–	+	+
V. (Schmallowitz)	+	+	–
VI. (Mary)	–	–	+
VII. (Nurse Braine)	+	–	–
VIII. (Superfan)	–	+	–

TABLE 1. Plus indicates that the element is present, minus that it is absent.

As mentioned above, the three options identifying the utterance in the story (‘a lie’, ‘not a lie’, ‘can’t say’) combine with the three degrees of certainty (‘very sure’, ‘fairly sure’, and ‘not too sure’ that others would agree) to provide a 7-point scale for rating the extent to which the utterance is considered a lie.

**3. RESULTS.** We hypothesized that an utterance containing just one of the prototype elements in 1a–c would be considered less of a lie than an utterance containing that element plus one other. This latter utterance, of course, would



in turn be less of a lie than one containing all three elements. We also expected that the data might indicate some ranking of the elements, in terms of importance in determining whether or not an utterance was a lie. Is it more important, for example, that S BELIEVE that what he is saying is false than that it be false in fact?

Adding up the total scores on each question, we got the results shown in Table 2, which gives the total score each story received across all subjects. The maximum possible score would be 469 (= scale score of 7 × 67 subjects), while the minimum possible score is 67. The mean scale score (= total score divided by 67) is also shown in Table 2.

STORY	TOTAL SCORE	MEAN SCALE SCORE (= TOTAL SCORE ÷ 67)
I. (Moe)	466	6.96
II. (John)	71	1.06
III. (Pigfat)	245	3.66
IV. (Katerina)	346	5.16
V. (Schmallowitz)	315	4.70
VI. (Mary)	233	3.48
VII. (Nurse Braine)	199	2.97
VIII. (Superfan)	309	4.61

TABLE 2.

The mean scale score for each story indicates the degree to which the subjects as a group considered it to contain a lie. The over-all results may be grasped by considering a plot of these values along the non-lie to lie scale, as shown in Figure 2. In that figure, the parentheses following each story number contain

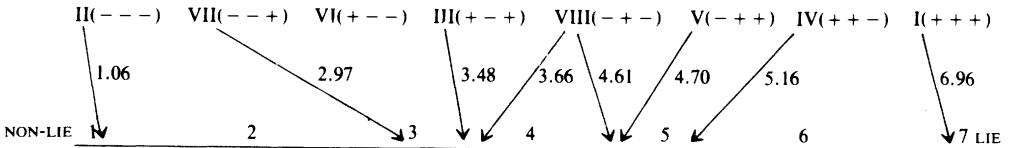


FIGURE 2.

the analysis of that story in terms of the three prototype elements 1a, b, and c, respectively. For example, ( - - + ) means that the story does not contain elements a and b, but does contain element c.

The general rule is that the more prototype elements a story contains, the higher it scores on the lie scale, with only one exception: Story VIII ( - + - ) scored higher than Story III ( + - + ). This exception probably results in part from the fact that VIII succeeded least well in conveying to our subjects what we desired; many saw it as containing more elements of the prototype than we intended. (This is discussed below when we consider methodological problems.)

If we compare stories in terms of the specific elements contained, the pattern of data supporting the over-all Prototype Hypothesis emerges in greater detail. According to this hypothesis (and the particular prototype proposed for *lie*),

if a pair of stories differ in that one contains each of the prototype elements that the other does, and also contains one or more additional element(s), then the story containing the added prototype element(s) should get an equal or higher *lie* score from a majority of subjects. For example, story I (+ + +) should outscore every other story, since it is the only one which contains all three prototype elements. Story III (+ - +) should outscore story VI (- - +), since the latter contains only element 1c (intent to deceive), while the former contains that element AND ALSO element 1a (false in fact). Nineteen pairs of stories yield this sort of prediction, and Table 3 presents the results

A	PROTOTYPE	B	PROTOTYPE	NUMBER OF	PRECEDING	
NUMBER OF	ELEMENTS IN	NUMBER OF	ELEMENTS	OR HIGHER	NUMBER AS A	SIGNIFICANT
STORY	STORY IN	STORY	IN STORY IN	LIE-SCORE TO	PROPORTION	AT .01 LEVEL?
	COLUMN A		COLUMN B	STORY IN	OF 67	
				COLUMN A		
I	+++	III	+ - +	67	1.00	YES
I	+++	IV	- + +	67	1.00	YES
I	+++	V	+ + -	67	1.00	YES
I	+++	VI	- - +	67	1.00	YES
I	+++	VII	+ - -	67	1.00	YES
I	+++	VIII	- + -	67	1.00	YES
I	+++	II	- - -	67	1.00	YES
III	+ - +	VI	- - +	50	.75	YES
III	+ - +	VII	+ - -	49	.73	YES
III	+ - +	II	- - -	67	1.00	YES
IV	- + +	VI	- - +	62	.93	YES
IV	- + +	VIII	- + -	55	.82	YES
IV	- + +	II	- - -	67	1.00	YES
V	+ + -	VII	+ - -	57	.85	YES
V	+ + -	VIII	- + -	42	.63	NO
V	+ + -	II	- - -	67	1.00	YES
VI	- - +	II	- - -	66	.99	YES
VII	+ - -	II	- - -	66	.99	YES
VIII	- + -	II	- - -	67	1.00	YES

TABLE 3.

of these nineteen comparisons. It can be observed here that, in every instance, the story that contained every element which the other did, plus at least one more element, received an equal or higher score from the majority of the 67 subjects. In all but one of these cases, the observed proportion was significant at the .01 level.<sup>7</sup>

<sup>7</sup> The statistical hypothesis tested in each case was that of getting at least as many successes as actually observed in 67 independent binomial trials with a probability of success of 50% on each trial. Each of the nineteen tests is thus analogous to tossing a coin 67 times, predicting in advance that the coin is biased toward, say, heads, and noting whether the proportion of heads actually observed is sufficiently high that, in a very large number of repetitions of a 67-toss experiment with a FAIR coin, fewer than 1% of the repetitions would yield a proportion of heads as high as this or higher. Note that this test depends on no properties of the scale beyond that of order.

The general Prototype Hypothesis, and the particular prototype definition proposed for *lie*, are confirmed by the data so far reviewed. We have seen that stories containing more of the hypothesized prototype elements receive higher *lie*-scores. We have seen further that, for each pair of stories which differ in that one contains every prototype element the other does, plus at least one more, the story containing the additional prototype element(s) receives the higher *lie*-score from a majority of subjects; and eighteen of these nineteen proportions achieve the .01 level of statistical significance. It is now apposite to ask whether the three prototype elements can be ranked in order of importance. We will see that they can be so ranked.

To establish whether there is a uniform order of importance among the prototype elements, we compare scores from stories that share a single element. If all such comparisons show a consistent pattern, we have evidence for a uniform ranking of importance of the prototype elements. For example, consider Stories III–V: both contain element 1a (false in fact) but differ in that III contains 1c (intent to deceive) but not 1b (believe false), while V contains 1b, but not 1c. Since V receives a higher mean score than III, this particular comparison indicates that element 1b is a more important element of the *lie* prototype than element 1c. This fact is indicated in abbreviated form in the first row of the left half of Table 4. All six entries in Table 4 are consistent

(V outscores III) implies (b outranks c)	(VIII outscores VI) implies (b outranks c)
(IV outscores III) implies (b outranks a)	(VIII outscores VII) implies (b outranks a)
(IV outscores V) implies (c outranks a)	(VI outscores VII) implies (c outranks a)

TABLE 4. Comparison of pairs of stories differing in exactly two elements.

with the unique ordering: 1b (believe false) is the most important element of the prototype; 1c (intent to deceive) is the next most important; and 1a (false in fact) is the least important.

4. DISCUSSION: PROTOTYPICAL PROPERTIES AND TYPICAL PROPERTIES. The comments elicited on the questionnaire frequently referred to the prototype properties of lies, 1a–c. Other properties were also mentioned, and the most frequent of these can serve to illustrate this discussion: typically lies are reprehensible acts, and subjects' judgments regarding motives, good and ill, entered into their thinking about how to score the stories. We had foreseen this possibility and, in an effort to control for it, we fashioned the stories so that the teller was always selfishly (as against altruistically) motivated; for example, Schmallowitz (V) is portrayed as fearing to offend his boss's wife, rather than as simply trying to be a nice guy. But, it may rightfully be asked, on what basis then do we omit reprehensibility of motive from the prototype of *lie*?

We cannot give a final answer to this question; still, the matter seems worth pursuing. Our admittedly hesitant answer is framed within the view that there is legitimate content to the traditional distinction between the information included in an ideal dictionary of a language and information that must be included in an encyclopaedic ethnography of the culture carried by speakers of that

language (Fillmore 1974:5 ff.) Not everyone agrees that this traditional distinction is worth maintaining (e.g. Nunberg 1978:iii et passim, Lakoff 1972); but for the present we adopt the position that to know, say, the Tahitian language is to know less than the entirety of Tahitian culture. Similarly, one may know the English language perfectly without knowing everything comprised in the totality of cultural knowledge of any particular community where English is the native tongue. Specifically, culturally competent members of some English-speaking community may be aware of certain real-world correlations that are not reflected in the semantics of English.

Let us illustrate. Some years ago, when the feminist movement was beginning to gain general attention in the United States, a riddle with a feminist moral started going the rounds. The feminist moral was drawn when the hearer of the riddle was stumped; not being able to crack the riddle showed the hearer's benighted state. It goes like this:

- (8) A young man is involved in an automobile accident in which his father is killed. Seriously injured, the youth is rushed to the emergency room of a hospital and a surgeon is called in. Upon entering and seeing the patient, the surgeon exclaims, 'Oh, my God. I can't possibly operate on my own son!' Explain.

The surgeon is, of course, the young man's mother; and the moral is that if the hearer were not a male supremacist, he (or she) would have no special difficulty in thinking of an otherwise unidentified surgeon as a woman. The present relevance of this bit of folklore is that the hearer cannot escape the accusation of sexism by saying that a female surgeon is, to any degree, not really a surgeon by virtue of being female. That is, the hearer has no grounds on which to complain that he/she was tricked by the use of the word *surgeon*. The reason the riddle makes its feminist point is precisely that we all know that what excludes women from surgeonhood is not a linguistic fiat, like that excluding whales from fish, but a social fiat, like that excluding blacks from country clubs.

But femaleness is by no means a property of TYPICAL surgeons. A female surgeon is not in any way a marginal or defective member of the category 'surgeon'—as would be, e.g., someone who had completed a surgical residency but not yet received State Board certification, or a physician in the habit of performing surgery but not licensed to do so. Nevertheless, a female surgeon is no less a surgeon for being female, though female surgeons may be rare as hens' teeth. (For that matter, a hen's tooth is no less a tooth for belonging to a hen, atypical as THAT may be.) As culture bearers, we know that few surgeons are females, and that few blacks are members of country clubs. But it is not clear that future social changes which might produce greater numbers of female surgeons, or black country-club members, would be ipso-facto linguistic changes, i.e. changes in the meanings of the words *surgeon* and *country club*. In fact, the traditional view is that such social changes are not ipso-facto changes in the meanings of relevant words. The conventional wisdom maintains a distinction between conventions of language and other social conventions,

including those affecting the facts to which words refer. According to this conventional wisdom, the hearer of the riddle has made the error of taking a merely typical property of surgeons (maleness) for a prototypical property.

Perhaps we want to distinguish *PROTOTYPICALITY* from mere *TYPICALITY*. We could then say either (a) that prototypical properties play a role in the meanings of words, while merely typical properties do not; or (b) that prototypical and typical properties both play roles in the meanings of words, but different kinds of roles. We favor formulation (a); but formulation (b) seems rather close to the distinction which Lakoff draws between semantic features that confer membership in categories and those that do not. Taking the word *fish* as an example, Lakoff exemplifies the semantic features that do not confer membership in categories by the feature 'swims-with-agility', and says that the hedge *regular* selects for just such features, permitting sentences like *Mark Spitz is a regular fish*. In both cases, there is agreement that the distinction is real. The disagreement concerns whether we want to say that the distinction is one between linguistically relevant properties and (important but) linguistically irrelevant ones, or that it concerns two kinds of linguistically relevant properties which play different roles in determining meaning.

Returning to *lie*, suppose that we ask a man whether it is a lie if you deliberately deceive people who are terminally ill, in order to spare them anguish; and he replies, 'No, because you are doing good for them rather than taking advantage of them.' Then suppose that we meet the same man two weeks later, and ask him under what sort of circumstances it's okay to lie; and he says, 'to terminally ill people when you're sparing them mental anguish.' The first response suggests that, for this man, 'reprehensibleness' is part of the meaning of *lie*: if the act is not reprehensible, you can't properly call it a lie. The second response indicates that reprehensibleness is not part of the meaning of *lie*: in answering our question, he is saying in effect that, in this case, lying is not reprehensible. What shall we make of such observations? (We haven't in fact made this particular observation, but we suspect that with a little ingenuity one could. The example comes from C. J. Fillmore.)

It seems that the use of some words, like *lie*, may depend on two sorts of considerations. One is the traditional question of what count as criteria for classifying a real-world thing in the category: perhaps we would like to reserve the term *SEMANTIC PROTOTYPE* for this constellation of things. But a second consideration is knowledge of the occasions, reasons etc. for deciding whether or not to classify something in a particular way. A frequent reason for reporting something as a lie is that we want to blame or criticize the person who said it; i.e., there is a strong association between a *SENTENCE* of the form *X lied* and an *ACT* of the (presumed) form 'I hereby blame/criticize/etc. X.' Perhaps when the hypothetical speaker above said, 'That isn't really lying', it was a gloss for what might have been more carefully reported, 'That isn't a case that deserves to have blame imputed, as is normally a concomitant of labeling something a lie.' Perhaps also the category-determining aspects of *lie* are what we would like to have in the dictionary, while the material that associates categorizing

someone as a liar with an act of blaming is part of the ethnography (of speaking?) of English.<sup>8</sup>

In this connection, consider the property of 'legality' with respect to the words *kill* and *murder*. We may want to say that (with human subjects and objects) acts called *killings* are typically illegal, but acts called *murders* are prototypically illegal. Thus, questions like 9 are normal, while those like 10 are deviant:

- (9) When is it legal to kill someone?  
 (10) ?\*When is it legal to murder someone?

This contrast suggests that the property of illegality plays a different role in the meanings of *kill* and *murder*. (Again, our example is from Fillmore.) One way to formulate this is to say that illegality is part of the semantic prototype of *murder* but not of *kill*, although that property is typically associated with acts properly labeled with either word.

It seems, in any case, that the relation between the property 'reprehensibility' and the word *lie* is comparable to that between 'illegality' and *kill*, rather than to that between 'illegality' and *murder*. Thus 11 is unexceptional, like 9; but 12, which calls into question the prototype element 'intent to deceive', seems defective in the same way as 10:

- (11) When can one lie without doing wrong?  
 (12) ?\*When can one lie without intending to deceive?

Note that, if one can respond at all to sentences 10 and 12, it is likely to be in similar ways, perhaps along the following lines:

- (13) Never, because *murder* MEANS breaking the law.  
 (14) Never, because *lying* MEANS trying to deceive someone.

Although this is not the only plausible way to do so, we summarize our observations by saying that reprehensibility, although characteristic of typical acts of lying, is not a prototypical property of such acts, and as such does not play a role in the semantic prototype (or in the meaning) of *lie*.

**5. FURTHER METHODOLOGICAL PROBLEMS.** For convenience, the raw scores for the various stories are reproduced in Table 5, along with the number of subjects who marked each story as 'lie', 'non-lie', or 'can't say'.

Table 5 itself raises a number of questions which the subjects' comments help us to answer. An example is the exceptionally high score given to VIII, which is supposed to have only one of the three elements, as compared with III, which has two. Of course, VIII has the most important element—the belief of S that what he is saying is untrue—which is lacking in III. In addition,

<sup>8</sup> The point has methodological consequences for this study, and they are elaborated in the following section. Briefly, we did not control for the seriousness of the (imagined) consequences in our stories—a point made by Robert Randall (p.c.) It seems, for example, that the seriousness of Nurse Braine's innocent misrepresentation may have influenced some subjects in the direction of CALLING it a lie—as against, say, Schmallowitz' innocuous, though deliberate, falsehood. That is, the responses to the questionnaire may represent, to some unmeasured degree, not only the extent to which the reported act fit the prototype of *lie*, but also the degree to which the subject felt motivated to label the reported act with a word that is ordinarily used to accuse or criticize.

STORY	ELEMENTS			RAW SCORE	SUBJECTS		
	Ia	Ib	Ic		+ lie	can't say	- lie
I. (Moe)	+	+	+	466	67	0	0
II. (John)	-	-	-	71	0	0	67
III. (Pigfat)	+	-	+	245	25	3	39
IV. (Katerina)	-	+	+	346	50	4	14
V. (Schmallowitz)	+	+	-	315	41	6	20
VI. (Mary)	-	-	+	233	18	7	42
VII. (Nurse Braine)	+	-	-	199	18	2	47
VIII. (Superfan)	-	+	-	309	38	8	21

TABLE 5.

however, the comments indicated that subjects were generally confused by VIII. Thus it was not clear to them whether Superfan was calling in sick because of his slight stomach ache, or because he wanted to go to the game. (There is the whole problem of degree: if one calls in sick when one is in fact sick, but not sick enough to require staying home from work, has one lied? This is probably a frequent real-world situation.) It seemed likewise not to be entirely clear whether Superfan intended his boss to deduce that he was going to the game, or was merely making an inept attempt to deceive, hoping his boss would not remember that it was the day of the game. Thus, although we intended this story to lack element Ic, it was probably read by several judges as containing that element (intent to deceive).

Story VII had been intended as a simple case of an honest mistake. It had occurred to us that the severity of the consequences resulting from such a mistake might bias people toward classifying it as a lie; but only one comment indicated that the consequences of Nurse Braine's error were taken into consideration in making a judgment. A number of subjects were medical people; interestingly, they all classed VII as a lie, and all made some comment on it. From the comments, it appears that the medical informants (and a few others) took something akin to a 'performative' analysis of VII, and classed THAT as a lie. Their reasoning ran as follows: Nurse Braine said that Jones was the appendectomy patient. In saying he was, she committed herself to knowing he was. Since in fact he was not, she could not have known that he was, and therefore she lied. (One nursing student assigned a *lie* rating to VII, but she mentioned that perhaps, if the nurse were completely convinced that she had not mixed up the charts, the utterance might not be considered a lie.) But did the gravity of Nurse Braine's error influence the subjects toward considering the 'performative' reading?

In earlier sections of this paper, we have supposed that the stories constituted equivalent stimuli except insofar as they differed with respect to presence or absence of the three *lie* prototype elements. In fact, none of the stories can be considered much like any of the others, because they deal with different real-world situations. As it turned out, and as the comments of the medical people on VII illustrate, the subjects tended to read additional real-world information into the stories; this undoubtedly influenced the responses in uncontrolled ways. For example, most of the comments on III indicated that it was irrelevant

whether or not the candy store had actually moved; in other words, the facts of the real world did not, in most cases, increase the likelihood of the utterance in III being considered a lie. This should have made III exactly parallel with VI in elements 1b-c (— — +). However, III received a somewhat higher score than VI, and 24 subjects identified III as a lie, compared with 17 for VI. Many of the comments indicated that the relationship of the characters may have affected the scoring. For example, one subject produced the following comments: on III, 'Theoretically, he did not lie—his intent says it's a lie', with an assigned score of 5 (not too sure—lie). On VI, 'Her intent was to deceive, but since they are not engaged—therefore not obligated—she should be free to withhold information', with a score of 4. Another subject, however, observed that, in VI, 'the seriousness of the relationship-type makes it a lie', giving a score of 6.

Again, though we had tried to get the appropriate configuration of elements in each question, some people added or subtracted. Thus a few comments on IV stated that the subjects themselves tended to get sick before tests, thus presumably eliminating the factor we had included—that S herself believed that what she was saying was not true. Another comment expressed the claim that one does not instantly get sick; there is some feeling of being 'down' leading to it. Hence Katerina, even if not consciously aware of being sick, was not lying. Based on the comments, one suspects that many people gave Katerina the benefit of the doubt: who would want to accuse a sick child of wrongdoing? Furthermore, many people have been in her situation at one time or another—not wanting to go to school to undergo a test—and hence are more apt to have sympathy with her than with Superfan (who is, after all, not a nervous child). One subject suggested that the use of the name 'Pigfat' in III evokes an unpleasant character, and that this, coupled with the idea of lying to one's mother, might tend to elevate scores.

Hence one source of noise in the data is the problem that people interpreted situations within the context of what they consider likely in the real world. It must be confessed that a story in which a character says something which he believes to be untrue, but without intent to deceive—but which turns out to be true—is difficult to deal with in the real world, where such situations seem rare. It may be significant that people often wanted to change the stories to make them accord better with their experience.

Another source of noise is the problem of making up a set of paradigmatically contrasting stories. One can try to eliminate the differences as much as possible; but if they are too much alike, subjects will be confused, and carry information from one story over into the next. If stories are different enough to avoid that pitfall, then one has problems with subjects' reactions to the non-paradigmatically contrasting information in the stories.

A third source of noise in the data is the common one of the uncoöperative (or too-coöperative) subjects. Since we were quite straightforward in saying what we were doing, we had no safeguards to eliminate the possibility that some subjects were giving intentionally misleading answers, though we have no reason to imagine they were. There also exists the more disturbing possibility



that people are, consciously or otherwise, modifying their responses to appear moral, broadminded, sympathetic, perspicacious, or the like.

A fourth source of noise shows up clearly in the scores for stories I–II, which should ideally have gotten raw scores of 469 and 67 respectively—since everyone should have been very sure that Story I would be agreed upon as a lie, and that II would be agreed on as a non-lie. In fact, the scores on these two items were 466 and 71 respectively. This may be a result of our using many sophisticated subjects—people who do linguistics may be loath to assume that ‘most other people’ are apt to agree with them (or with each other) on anything about language. This was in fact the reason given by one subject, who had just finished a year’s postdoctoral fellowship in linguistics at MIT, for her assigning scores of 6 and 2 respectively to Stories I–II (which should have received universal scores of 7 and 1). She commented that she was no longer very sure that a majority of English speakers agreed about ANYTHING.

One subject stated that he was certain that a particular question contained a lie, but that he was equally certain that the situation was not an uncommon one, and that most people probably would not consider the utterance in question a lie. A fifth source of noise, then, is that some subjects may have taken the scale literally, and supplied two different pieces of information where we sought only one—how much of a lie or non-lie a particular utterance was. Considering these several sources of noise in the data, it is noteworthy that the over-all pattern of response showed the level of consistency it did.

So far, in talking about ‘sources of noise’, we have taken for granted the notion that a questionnaire of this kind can yield useful semantic data; but this assumption may itself be challenged from several points of view. First, there is the objection of the ethnographer and social interactionist that the tasks of responding to a questionnaire (regarding word use) and using a word (in unreflecting speech) are quite different, and consequently that inferences from people’s behavior in the first sort of (experimental) setting to their behavior in the second sort of (natural) setting are not guaranteed. We appreciate the force of this observation; and we suggest that the inferences we have drawn here are neither automatic nor uncontrolled, but rather derive from a method designed precisely with this observation in mind. More specifically, our hypothesized prototype definition of *lie* was drawn from our experience as native participant observers in the same speech community as our subjects. From this ethnographic experience regarding word usage in ordinary speech contexts, and from a particular theory of word meaning, we inferred how a certain set of experimental data should pattern. The data were then gathered and found to pattern in the predicted way. The point of note is that the direction of inference runs from naturalistic observation, via theory, to experimental prediction.

The logic of this procedure is seen if we consider, first, what inferences one might be able to draw if the experiment had not worked. Had that been the outcome, one would have been unable to choose among the following three interpretations: (a) The Prototype Theory of word meaning is correct for normal speech, but the experimental task was so artificial that that fact was obscured;

i.e., our theory was right, but the experiment was ill-conceived. (b) The Prototype Theory is wrong, and this was revealed by the experiment, which was well-conceived. (c) The experiment was ill-conceived and unrelated to linguistic behavior in ordinary settings; but, as it happens, the Prototype Theory is wrong anyway, so that even a well-conceived experiment would also have yielded negative results. Returning now to the fact of the matter—that the experiment turned out positively—we may consider the possible interpretation that the result was fortuitous, i.e. that the patterning of the data is only descriptive of people's performance in this artificial, experimental setting, but not in ordinary life. This interpretation is unlikely because the experimental task was constructed only after we had formulated the prototype definition of *lie* on the basis of our prior naturalistic observations and the prototype notion of meaning. The only reasonable conclusion is that the positive outcome of the experiment does provide evidence for the prototype notion, for the particular prototype proposed for *lie*, and for the (rough) accuracy of the experiment in tapping behavior relevant to everyday life. If the experiment had been ill-conceived, it would almost certainly have produced a negative result.

We suggest, therefore, that experimental investigations, using questionnaires or other relatively controlled stimuli, may (when they are motivated both by observation in natural settings and by theory) serve as useful adjuncts to the usual, more intuitive methods of the ethnographer, social interactionist, and introspective linguist. We further suggest that social science experiments that are motivated both by prior naturalistic observation and by theory have built into their context of use a good deal of control over the vagaries of inference that harry certain varieties of 'objective' social science.

A second closely-related observation is that lying is an inherently social act. Hence an investigation of the word *lie* might lead naturally into a full-scale investigation of communicational and interactional sociology. It is an open question—and a hotly debated one—whether one can sensibly investigate the meaning of a word like *lie* without compiling an exhaustive inventory of the institution of lying—which, in turn, many believe could only be understood within the context of an even larger matrix of social analysis. Can a tenable distinction be drawn between the meaning of a word and all the knowledge of the world that is connected with the use of that word? As John Searle has asked (p.c.), is it possible to imagine the difference between a definition of the word *oscilloscope* and a description of an oscilloscope? We cannot attempt to answer that question here, although we have touched upon it (gingerly) at several places in the preceding discussion. Perhaps it is not altogether fatuous to hope that empirical investigations may eventually lead to some consensus in an area in which two thousand years of philosophical disputation have failed to do so. We have adopted the distinction between linguistic meaning and language use, and that between knowledge of language and knowledge of the world, as working assumptions on which to base our empirical investigation. These working assumptions provide some justification for us not to support our results with a comprehensive sociological analysis of lying. But, of course, limits of time, space, and competence would have precluded that anyway.

6. CONCLUSIONS. We have argued that many words, and the word *lie* in particular, have as their meanings not a list of necessary and sufficient conditions that a thing or event must satisfy to count as a member of the category denoted by the word, but rather a psychological object or process which we have called a PROTOTYPE. In some cases, a prototype can be represented by a list of conditions; but these are not necessary conditions, and the evaluative logic according to which these conditions are found to be satisfied, or not, is in general one of degree rather than of simple truth and falsity. (Not all semantic prototypes are felicitously represented by a LIST of conditions at all, e.g. those defining basic color terms; cf. Kay & McDaniel.)

In particular, we formulated (on the basis of the sort of introspection usual in semantic and syntactic research) a prototype for the word *lie*, consisting of three elements: falsity, intent to speak falsely, and intent to deceive. Stories were then constructed which described speech acts embodying each of the eight possible combinations of these three elements; these were presented to subjects, to be judged on the extent to which the relevant character in the story could be said to have lied. The pattern of responses confirmed the theory. The stories containing and lacking all three elements received by far the highest and lowest scores respectively. Further, in comparing each pair of stories in which the first contained all the prototype elements of the second plus at least one more, the majority of informants always gave the higher *lie*-score to the first. Of the nineteen comparisons of this type, each of which turned out as predicted, eighteen produced proportions significant at the .01 level. We then compared each pair of stories which differed in the presence of exactly two elements, to see if these comparisons yielded a consistent pattern with respect to the relative importance of the prototype elements. A consistent pattern was found: falsity of belief is the most important element of the prototype of *lie*, intended deception is the next most important element, and factual falsity is the least important.

In an earlier, oral version of this paper, we attempted a quantitative analysis of the results in which additive weights were estimated for each prototype element, and the score for a story was predicted to be the sum of these weights. Although this approach appeared promising initially, subsequent analysis has led us to abandon such a precise quantitative model for the present corpus. Nonetheless, the data and analysis presented above appear to establish (a) that *lie* is a word whose definition does involve a prototype in the sense discussed above; (b) that the prototype probably contains the three elements we have considered, and perhaps others; (c) that subjects fairly easily and reliably assign the word *lie* to reported speech acts in a more-or-less, rather than all-or-none, fashion; and (d) that subjects agree fairly generally on the relative weights of the elements of the semantic prototype of *lie*.

#### REFERENCES

- BERLIN, BRENT, and PAUL KAY. 1969. Basic color terms: Their universality and evolution. Berkeley & Los Angeles: University of California Press.  
 BLACK, MAX. 1954. Problems of analysis. Ithaca: Cornell University Press.  
 CHOMSKY, NOAM. 1965. Aspects of the theory of syntax. Cambridge, MA: MIT Press.

- FILLMORE, CHARLES J. 1974. The future of semantics. *Berkeley studies in syntax and semantics*, vol. I, IV:1-38.
- . 1975. An alternative to checklist theories of meaning. *Proceedings of the 1st Annual Meeting, Berkeley Linguistics Society*, 123-31.
- KAY, PAUL. 1978. Tahitian words for race and class. *Publications de la Société des Océanistes*, 39.81-91.
- , and CHAD K. MCDANIEL. 1978. The linguistic significance of the meanings of basic color terms. *Lg.* 54.610-46.
- KEMPTON, WILLETT M. 1977. Grading of category membership in the folk classification of ceramics. Austin: University of Texas dissertation.
- LABOV, WILLIAM. 1973. The boundaries of words and their meanings. *New ways of analyzing variation in English*, ed. by Roger Shuy & Charles-James N. Bailey, 340-73. Washington, DC: Georgetown University Press.
- LAKOFF, GEORGE. 1972. Hedges: A study in meaning criteria and the logic of fuzzy concepts. *Papers from the 8th Regional Meeting, Chicago Linguistic Society*, 183-228.
- LEECH, GEOFFREY. 1974. *Semantics*. Harmondsworth: Penguin.
- NUNBERG, GEOFFREY D. 1978. *The pragmatics of reference*. Bloomington: Indiana University Linguistics Club.
- PUTNAM, HILARY. 1975. The meaning of 'meaning'. *Minnesota studies in philosophy*, ed. by Keith Gunderson, 131-93. Minneapolis: University of Minnesota.
- ROSCH, ELEANOR. 1975. Human categorization. *Advances in cross-cultural psychology*, ed. by Neil Warren, 1.1-72. London: Academic Press.
- WALLACE, ANTHONY F. C., and JOHN R. ATKINS. 1960. The meaning of kinship terms. *American Anthropologist* 62.58-80.
- WEINREICH, URIEL. 1966. Explorations in semantic theory. *Current trends in linguistics*, ed. by Thomas Sebeok, 3.395-477. The Hague: Mouton.
- ZADEH, LOTFI. 1965. Fuzzy sets. *Information and Control* 8.338-53.

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