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Reviewed work(s):
Source: *American Anthropologist*, New Series, Vol. 70, No. 2 (Apr., 1968), pp. 290-299
Published by: Wiley on behalf of the American Anthropological Association
Stable URL: http://www.jstor.org/stable/671117
Accessed: 17/01/2013 13:15

Covert Categories and Folk Taxonomies

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Much of the recent work in ethnoscience has been concerned with the nature of folk taxonomies, an often stated definition of which requires that all folk taxa be monolexemically labeled. This paper offers evidence that unlabeled categories may also be of crucial taxonomic significance, and we feel that it is inappropriate to treat such categories apart from the named taxonomic entities of the system. More importantly, evidence presented indicates that by recognizing unnamed taxa one may gain an understanding of the structure of a particular semantic domain that is actually obscured if one focuses solely on lexically labeled units.

MUCH of the productive work in ethnoscience today derives from collaborative research in certain areas of ethnobiology (see Colby 1966, Sturtevant 1964 for a survey of these materials). It is often found that the semantic structures uncovered by such research are hierarchic in their formal characteristics. Thus they resemble the classificatory structures conventionally employed in the biological sciences and have generally been termed *(folk) taxonomies* (Conklin 1962a, 1962b, 1964; Durbin 1966; Frake 1961, 1962; Gregg 1954; Kay 1966; Lounsbury 1964; Romney n.d.).

Most writers agree on a definition of a folk taxonomy similar to the following: "A system of monolexemically labelled folk segregates related by hierarchic inclusion . . ." (Conklin 1962a:128). But must the segregates, or categories, included in such taxonomies necessarily be monolexemically labeled? Or is Keesing correct in asserting "If we insist that the descriptive units of an ethnography be lexically labelled, we are likely to arrive at a very limited sort of description: an ethnography of how people talk about what they do, not what they do or expect each other to do. . . . There is ample evidence that expectations and distinctions need not be directly mapped in language" (1966:23)?

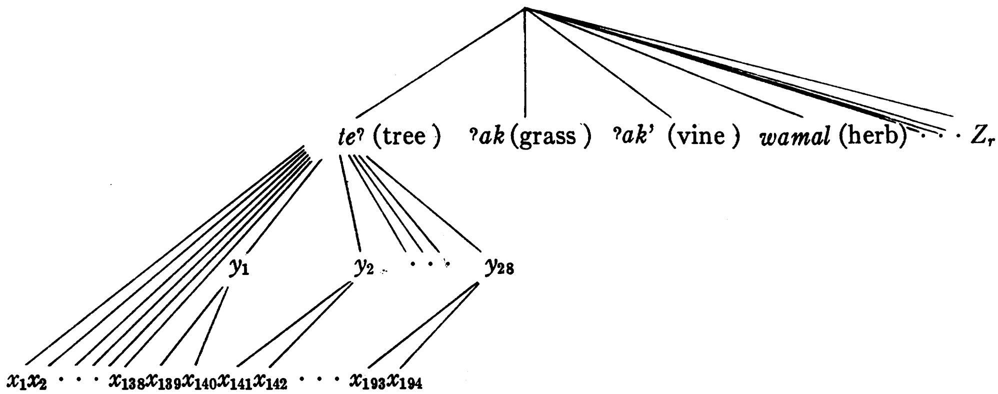
In questioning the utility of restricting ethnographic description to labeled categories, Keesing has pointed the way toward a reexamination of one of the most fundamental assumptions of ethnoscience. It is questionable, however, whether "ample evidence" is actually available to support his position. The purpose of the present paper is in part to correct this deficiency.

TZELTAL PLANT TAXONOMY

In our research in Tzeltal botanical ethnography,[1] we have found it possible to determine with a high degree of reliability the major outlines of the named taxonomic structure of the plant world for Tzeltal speakers (Berlin, Breedlove and Raven in preparation). In the course of this work, we have discovered many meaningful and culturally revealing categories related by inclusion that are not conventionally, monolexemically labeled. In fact, many of these categories receive no habitual linguistic designations of any sort. We feel that it is inappropriate to treat such categories separately from the named taxonomic entities of the system. More importantly, we shall present evidence that by recognizing unnamed taxa, one may gain an understanding of the structure of a particular semantic domain that is actually obscured if one focuses solely on lexically labeled units.

At the highest level of the Tzeltal plant taxonomy, there is no monolexemic taxon, or "unique beginner," in which all other Tzeltal plant taxa are included. Nevertheless, it has been possible to establish, by the procedures outlined below, that animals and plants are distinguished as two separate unnamed classes by Tzeltal speakers.[2] In the absence of any "unique beginner," the highest level in Tzeltal plant taxonomy is represented by four major plant-class lexemes in which some eighty per-

Accepted for publication March 13, 1967.



$x_i (i=1, 2, \cdots, 194)$ indicates a specific taxon dominated by *teʔ*.
For $i \leq 138$, x_i is immediately preceded by *teʔ*. For $139 \leq i \leq 194$, x_i is not immediately preceded by *teʔ*.
$y_i (i=1, 2, \cdots, 28)$ indicates a non-specific taxon immediately preceded by *teʔ*.
$z_i (i=1, 2, \cdots, r)$ indicates a taxon in *direct contrast* with *teʔ*.

FIGURE 1. Schematic representation of the Tzeltal plant taxon *teʔ* (trees) and its included members indicating the paucity of midlevel named taxa.

cent of all Tzeltal plant names are included. In addition to and coordinate with these major plant classes are a series of taxa that are for the most part botanically unusual when judged by the morphological criteria that define the four major classes: *teʔ* (trees), *ʔak'* (vines), *ʔak* (grasses), and *wamal* (herbs). These minor classes are considered to be separate, unaffiliated groups, and include, for example, certain epiphytes, cacti, agaves, and bamboos.

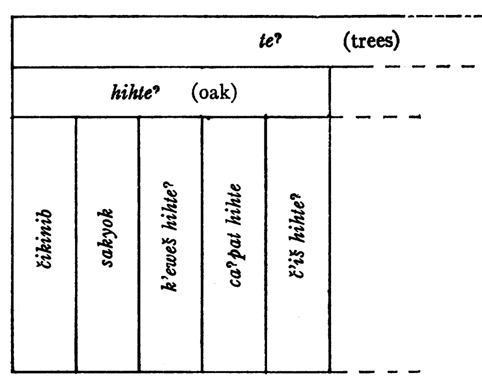
Within these coordinate major and minor plant classes are grouped all of the Tzeltal *specific taxa*, i.e., those taxa which include no other members. There are, however, very few *midlevel* plant categories in the taxonomy that are lexemically labeled. We have selected the major plant class *teʔ*, as described by one of our 50 informants, to illustrate this general lack of midrange named taxa.

It will be noted in Figure 1 that the taxon *teʔ* immediately includes no less than 166 members ($x_1, x_2, \cdots, x_{138}; y_1, y_2, \cdots, y_{28}$). Exactly 138 of the taxa in this contrast set, or 83 percent, are specific taxa. The remaining 28 terms of the contrast set are nonspecific, each immediately including from two to seven specific taxa. At no point does one find subhierarchies that exceed more than two levels in depth. The total number of specific taxa in this class, for this informant, is 194.

An example of a midlevel, nonspecific taxon is *hihteʔ* (oak), as seen in Figure 2.

The linguistic structure of the names *sakyok* and *čikinib* do not in themselves indicate their inclusion in *hihteʔ*, although these plants are consistently considered as kinds of *hihteʔ* by Tzeltal speakers.

The remaining three major classes, *wamal*, *ʔak*, and *ʔak'* show a similar paucity of nonspecific taxa.



Botanical ranges of each specific taxon:
čikinib: Quercus acatenangensis Trel., *Quercus mexicana* Humb. & Bonpl., & *Quercus sapotifolia* Liebm.
sakyok: Quercus candicans Neé, *Quercus crassifolia* Humb. & Bonpl. in part.
k'eweš hihteʔ: Quercus segoviensis Liebm., *Quercus polymorpha* Schlecht. & Cham.
caʔpat hihteʔ: Quercus peduncularis Neé, *Quercus rugosa* Neé, & *Quercus crassifolia* Humb. & Bonpl. in part.
č'iš hihteʔ: Quercus corrugata Hook.

Figure 2. An example of the named midlevel taxon *hihteʔ* (oak) and its included members.

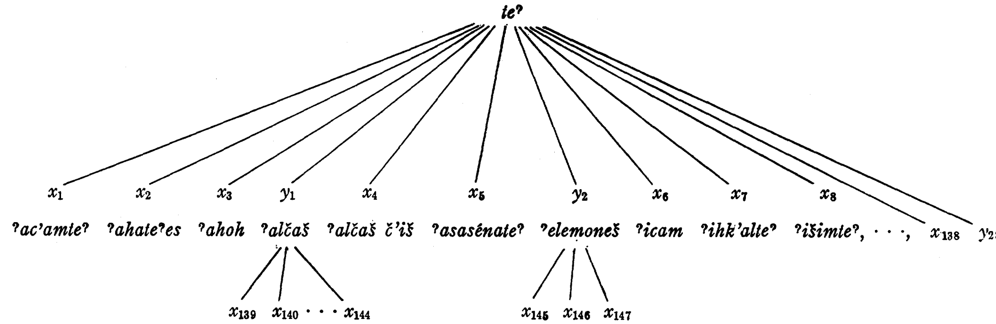


FIGURE 3. Portion of the contrast set immediately included in the taxon *teʔ*. Horizontal ordering of the coordinate taxa is arbitrarily alphabetical.

COVERT MIDLEVEL CATEGORIES

It is possible, of course, to accept the structure in Figure 1 as displaying all of the culturally obligatory inclusion relationships among the relevant taxa of the class *teʔ* and to proceed to other problems. Such a decision would depend, in part, on one's definition of a taxonomy. Thus Conklin, in his classic study of Hanunóo ethnobotany (1954), describes a similarly shallow plant taxonomy, but goes on to note that other "midgroupings of plants are made, of course, but not according to a structured terminologically-identifiable system" (1954:97).

If such actual or potential midgroupings of plant taxa are ignored, however, it becomes difficult if not impossible to develop a rationale for horizontally ordering the individual plant taxa within each of the many-membered contrast sets. Let us return our focus to a portion of the contrast set immediately included in *teʔ* to clarify this point. If one relies solely on the relationships revealed by the taxonomic classification of the named taxa, the horizontal ordering of the immediately included items is necessarily arbitrary. The order could presumably be alphabetical, as seen in Figure 3. The items might also be arranged in terms of their relationships as displayed by the general-purpose Linnaean system of classification. Such an arrangement would clearly not be the most ethnographically relevant one possible.

One alternative to the arbitrary ordering of coordinate taxa derives from the intuition, mentioned above, that unlabeled, midlevel categories exist for our informants. If such categories can be shown to exist, one might expect that smaller subsets of terms within a named contrast set would be conceptually grouped together. These unnamed subsets would then have a high information content with considerable psychological relevance.[3] They would proceed directly from the special-purpose, highly specific taxonomy of our informants. (Our use of "general purpose" *vs.* "special purpose" taxonomy is outlined more fully in Berlin, Breedlove and Raven, 1966: 275.)

TESTING THE HYPOTHESIS

In general, we set out to determine the existence of culturally significant subgroupings by employing several field procedures. The first consisted of simple ethnographic observations and recordings of informants' comments on plants in natural contexts. During the process of botanical collecting of some 10,000 specimens with native informants, much evidence was accumulated that suggested that some plants in the same named contrast set were more closely related, cognitively, than others. These data included discussions of ethnobotanical features of certain groups of plants, visual demonstrations of similar plants, importance as food, herbs, firewood, and so on. Such observations, while sporadic and anecdotal in character, were important checks on the results of the methods of grouping discussed below. Thus, the many hours of informal discussion with informants in the field were extremely helpful in providing insights into what might or might not prove to be a potential ethnobotanical semantic dimension.[4]

A second method we have found useful in searching for possible subgroupings within contrast sets of large numbers was to determine the extent to which informants subdivided lists of plant names. Instruction concerning the task of grouping was accomplished as follows. Several names of plants and animals, written on separate slips of paper, were presented to an informant. He was then instructed to read the names on each slip and to put into separate groups those that were "most like one other." The Tzeltal interrogation was as follows:

> *bitik sbil ya shun sba sok*
> (Which names group with one another?)

Informants had no problem in grouping these names correctly, animal names being placed in one set, plant names in another. These data, along with observation in natural contexts, indicated the existence of an unnamed group, "plants," as mentioned above.

Following the grouping of plants and animals, a set of plant names was presented to each informant, some of the names belonging to one major Tzeltal class, some to another, e.g., names for two kinds of trees as opposed to the name for a particular kind of herb. Instructions were the same as those given for the grouping of animal and plant names. As expected, informants had no difficulty in grouping names that belonged to the same major Tzeltal plant class.

Once it became clear that the task was understood, the names of the immediately included taxa of each major class name, written on slips of paper, were presented to informants with instructions to read through the lists and place in separate piles those names which applied to plants that were judged to be similar to one another. We found that such subgroupings of closely semantically related items within the same contrast set is easily accomplished by trained informants. We have also found the resulting sets to be highly reliable. The ability of native informants to perform such grouping tasks, in conjunction with the reliability of the resulting groups, is a good indication of the psychological saliency of the classification.[5]

Our inquiry did not stop at merely requiring informants to subgroup items within the same contrast set of named specifics. We also found it possible to determine many of the conceptual features that were shared among plants within each set, as well as to determine certain features that distinguished items within a set. The procedures outlined below also indicated that some of the first sets isolated by informants included yet other important, unlabeled conceptual groupings.

Having demonstrated the existence of such subgroupings, we used three main procedures to investigate their defining conceptual features. The first was the so-called *triads-test*, used by Romney and D'Andrade (1964) in their analysis of American kinship data and first employed ethnographically by D'Andrade (n.d.) in his early Tzeltal ethnobotanical work. The procedure requires informants to specify which item in a set of three is "most different" from the others. The results, when run for all logical triads in a set of terms, provide some indication of the total cognitive similarity of each term to all others in the set. This procedure is clearly restricted to sets of relatively small size because of the larger and larger numbers of triads that an informant must examine as the number of items in the set increases.[6]

A second procedure in the discovery of characteristics of ethnobotanical relevance is the construction of *folk keys* by informants. Keys are routinely employed for biological purposes and consist of a series of successive binary divisions of a set of organisms, the characteristics used for each division being specified, until each organism in the set has been distinguished from all others. In our field procedure, an informant was presented with a set of plant names that he had earlier isolated as being cognitively similar to one another. He was then asked to construct a key for this set of organisms, accounting for all the included forms. By this means, the informant was required to verbalize all of the conceptual distinctions he has utilized in making the divisions. Such keys provide useful data when compared with the results obtained by other tests.

Our third procedure consists of *paired comparisons* of all lexical items in a particular delimited set of plant names. In completing this task the informant was requested to compare all logical pairs in any set in terms of all the similarities and differences that he felt were relevant for any pair. Such characteristics as the manner of stem growth, size and shape of the stem and leaves, internode length, and fruit size and shape have been utilized in these discriminations. Responses obtained by this method can later be converted into a standard notation for distinctive features that allows the investigator to scan "componential definitions" of a set of terms, and, as a consequence, bring together those terms that are most similar in terms of those features judged important by the informant.

All of these simple techniques can be employed by any intelligent, semiliterate informant. To illustrate their use, we have selected one informant's subgrouping of a set of plant names for "vines" (*ˀak'*). This classification was similar to that constructed by other informants presented with the same situation and is selected for illustrative purposes only. This particular set of plants names was isolated by the sorting procedure described earlier and consisted of the following Tzeltal terms[7]:

bohč	(large gourd)	*Lagenaria siceraria* (Mol.)Standl.
cu	(bottle gourd)	*Lagenaria siceraria* (Mol.)Standl.
c'ol	(squash)	*Cucurbita pepo* L.
č'um	(pumpkin)	*Cucurbita moschata* Duch.
mayil	(perennial squash)	*Cucurbita ficifolia* Bouché

There are ten possible triads for this set of forms. One informant, when presented with all logical triads, made the responses shown in Table 1. The number of times any two lexemes in the set were classed together (i.e., judged most similar in any triad) is given in Table 2. Table 2 indicates that *bohč* and *mayil* were never classed together in any triad. On the other hand, *mayil* was classed twice with *c'ol* and twice with *č'um*; i.e., it was judged to be equally similar to both. The pairs *bohč-cu* and *c'ol-č'*um were judged to be closest in three triads.

The divisions made in a folk key constructed for the same set of plant names are shown graphically in Figure 4. The conceptual dimensions with their appropriate values verbalized for this key are indicated in Table 3.

Small letters with subscripts indicate values for a particular dimension. It can be seen readily that the ordering of plant names in the key is identical in hierarchical structure to that derived from the triads data.

The results of our third procedure, that of paired comparisons for all items in the set, are shown in Table 4. Not all dimensions are equally relevant for all terms in the set. Thus dimension *G*, color of the meat of the fruit, is not relevant, and hence omitted, for the gourds *bohč* and *cu*. Fruit size (dimension *F*) is relevant for *bohč* and *cu*, but these gourds range over both of the values for the dimension (large and small). Consequently, the letter for the dimension of size appears without subscripts for *bohč* and *cu*.

We noted earlier that the number of shared features between two items in a set provides an index of their overall similarity as judged by the informant. The number of shared features for every pair of items in the set is shown in a

TABLE 1. ALL POSSIBLE TRIADS IN SET OF FIVE SEMANTICALLY RELATED TZELTAL PLANT NAMES

1)	*bohč*	*cu*	*c'ol*
2)	*bohč*	*cu*	*č'um*
3)	*bohč*	*cu*	*mayil*
4)	*bohč*	*c'ol*	*č'um*
5)	*bohč*	*c'ol*	*mayil*
6)	*bohč*	*č'um*	*mayil*
7)	*cu*	*c'ol*	*č'um*
8)	*cu*	*c'ol*	*mayil*
9)	*cu*	*č'um*	*mayil*
10)	*c'ol*	*č'um*	*mayil*

Underlined terms were judged "most different" in each triad.

TABLE 2. NUMBER OF TIMES ANY TWO ITEMS WERE JUDGED "MOST SIMILAR" IN ANY TRIAD COMPRISED OF FIVE CONCEPTUALLY RELATED "VINE" NAMES

	bohč	*cu*	*mayil*	*c'ol*	*č'um*
bohč	—	3	0	0	0
cu		—	0	0	0
mayil			—	2	2
c'ol				—	3
č'um					—

TABLE 3. CONCEPTUAL DIMENSIONS UTILIZED IN THE CONSTRUCTION OF THE TZELTAL FOLK KEY GIVEN IN FIGURE 4

(A)	"Kind of vine" [uniting feature for the total set]: Herbaceous creepers with large leaves and similar fruits and flowers.	
(B)	vine texture:	b_1 hairy b_2 spiny
(C)	fruit shape:	c_1 disk-shaped c_2 elongated
(D)	vine-leaf color:	d_1 blackish [relatively dark] d_2 whitish [relatively white]
(E)	flesh color of fruit:	e_1 white e_2 yellow

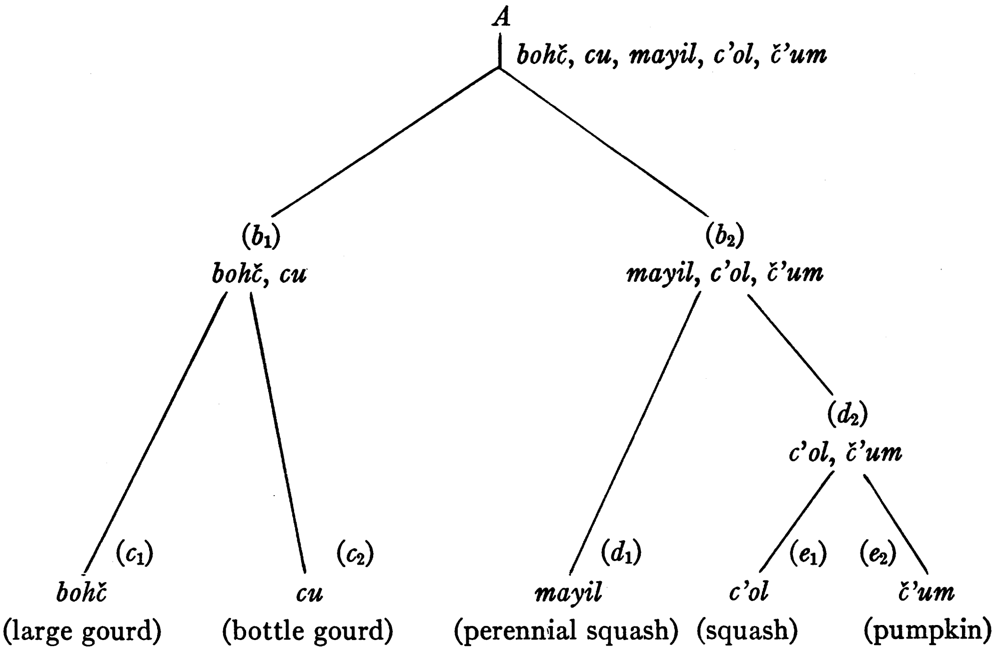


FIGURE 4. Tzeltal folk key constructed for set of five conceptually related "vines."

matrix in Table 5 for comparison with the findings made by the triad and key methods of evaluation. As might be expected, these three sets of data correspond closely. Thus *bohč* and *cu* are similar in that they share five out of six possible features, but *bohč* shares only one feature with *mayil*, *č'um*, and *c'ol*, and *cu* shares only two with *mayil* and none (other than the uniting value of the set) with *č'um* or *c'ol*. The squash *mayil* is approximately equally similar to *č'um* and *c'ol*, sharing three out of seven features with *č'um* and four out of seven features with *c'ol*. Finally, as our other data would suggest, *č'um* and *c'ol* share five out of seven features, showing them to be conceptually very similar.

From the botanical point of view, the Tzeltal treatment given this set is quite understandable. First, the subset of five Tzeltal names, although not included in a named

TABLE 4. FOLK FEATURE DEFINITIONS OF TZELTAL PLANT NAMES OF FIVE CONCEPTUALLY RELATED "VINES" AS COMPILED FROM PAIRED COMPARISONS

Dimensions	*Values*
(A) stem texture	a_1 hairy; a_2 spiney
(B) leaf texture	b_1 hairy; b_2 spiney
(C) flower color	c_1 white; c_2 yellow
(D) fruit shape	d_1 disk-like; d_2 elongated
(E) leaf color	e_1 relatively light; e_2 relatively dark
(F) fruit size	f_1 large; f_2 small
(G) color of meat of fruit	g_1 yellow; g_2 white

Definitions of plant names

bohč	$a_1b_1c_1d_1e_1f$
cu	$a_1b_1c_1d_2e_1f$
mayil	$a_2b_2c_2d_2e_1f_2g_2$
č'um	$a_2b_2c_2d_1e_2f_1g_2$
c'ol	$a_2b_2c_2d_1e_2f_2g_1$

TABLE 5. MATRIX INDICATING NUMBER OF SHARED FEATURES FOR ALL LOGICAL PAIRS OF PLANT NAMES DEFINED IN TABLE 4

	bohč	*cu*	*mayil*	*č'um*	*c'ol*
bohč	—	5 (6)	1 (6)	1 (6)	1 (6)
cu		—	2 (6)	0 (6)	0 (6)
mayil			—	3 (7)	4 (7)
č'um				—	5 (7)
c'ol					—

Figures in parentheses indicate potential number of dimensions on which two plants might be compared.

Tzeltal taxon, does form a morphologically coherent group. Of all members of the family Cucurbitaceae familiar to Tzeltal speakers, these five are the only members of the tribe Cucurbiteae (Jeffrey 1962). They have larger flowers than any other member of the family known to these people, and are the only ones having large fruits with tough rinds. Within this group, the first obligatory division corresponds to a recognition of the major differences between the group comprizing *bohč* and *cu* and that including *mayil*, *č'um*, and *c'ol*. The gourds *bohč* and *cu* both belong to the species *Lagenaria siceraria*, although their fruits are very different and provide the basis for their being given distinctive Tzeltal names. The other three items in the subset—*mayil*, *č'um*, and *c'ol*—represent different species of the genus *Cucurbita*. *Lagenaria* is a member of the subtribe Benincasinae, whereas *Cucurbita* belongs to a different subtribe, Cucurbitinae.

It is interesting now to compare the taxonomic structure of this subset when one restricts it to labeled taxa, on the one hand, and when one includes empirically validated unnamed taxa, on the other. It is clear that the amount of culturally revealing information displayed in Figure 6 is significantly greater than that in Figure 5.

SUMMARY AND CONCLUSIONS

To summarize, we have presented empirical evidence that unlabeled taxa do exist for Tzeltal speakers. The nodes of the hierarchy generated by our eliciting procedures are *not* arbitrarily spaced and not permutable in their vertical or sequential ordering; therefore they clearly imply a taxonomic structure. This structure is not an arbitrary key generated in terms of culturally irrelevant oppositions of our own invention (cf. Conklin 1962a:135–136; 1962b:90–91; 1964:39–41). Much additional evidence that we have accumulated supports the existence of these unnamed taxa and clearly points to their cultural validity, both in the particular example discussed in detail and in many analogous instances. (The taxon *te?*, for example, now is believed to immediately include no less than thirty unnamed taxa.)

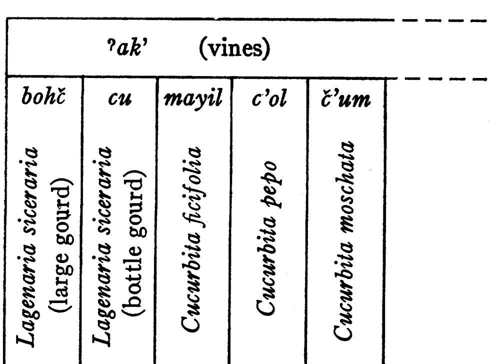


FIGURE 5. Taxonomic structure that indicates labeled taxa only for a subset of "vines."

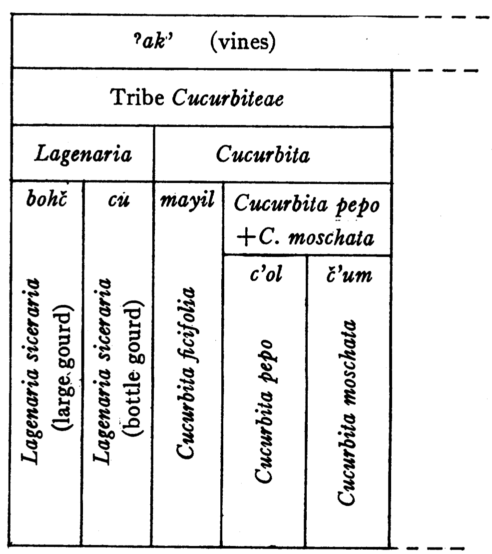


FIGURE 6. Taxonomic structure that indicates both labeled and unlabeled taxa for a subset of "vines."

There is a widely held view that the "concept of the genus is as old as folk-science itself" (Davis & Heywood 1963:103). It seems clear that this and other midlevel categories in taxonomic hierarchies have grown up synthetically, by the grouping of *kinds* of plants and animals. Specifically, the labeling of initially unnamed categories that prove to have cultural validity and predictiveness about the included forms would appear to have been a principal route to the verbalization of more and more complex hierarchies. We have already considered a probable later step in this process in the example of *hihteʔ*. In the development and rationalization of formal Linnaean taxonomy, genus, family, order and many other midlevel categories have been defined and named as a means of reflecting increasing amounts of information about the organisms being classified. It is extremely instructive to examine the structure of a folk taxonomy such as that of the Tzeltal, in which these midlevel categories are present in an incipient, unlabeled form. In fact, these findings help us to better understand the development and structure of our own "general-purpose" taxonomy.

Our data can also be interpreted as having some bearing on the somewhat neglected hypothesis of Miller (1956) and Wallace (1961) concerning the capacity of *Homo sapiens* to store and process information. Wallace's hypothesis states that "*irrespective of race, culture, or evolutionary level, culturally institutionalized folk taxonomies will not contain more than 2^6 entities and consequently will not require more than six orthogonally related binary dimensions for the definitions of all of the terms*" (Wallace 1961:462). The maximum number of entities that can be contained in a space of six binary dimensions is sixty-four and presumably no folk taxonomy should contain more than this number of folk taxa.

However, it is clear that Wallace is not referring to the folk taxonomy *in toto*, but to any particular contrast set contained within it (Colby 1966:15). (See Wallace's [1961:462] definition of a taxonomy as "a group of symbols . . . which denote mutually exclusive but jointly exhaustive subsets of referents within a set denoted by a cover symbol [immediately including taxon?].")

Should this interpretation be correct, i.e., a maximum number of 64 items in any particular contrast set, our data concerning unnamed categories would tend to support Wallace's position. Thus, conceptually, each of our multimembered "named" contrast sets are in actuality subdivided into several more cognitively amenable contrast sets, many of which are included in unnamed taxa. By recognizing unlabeled taxa, our data show clearly that no contrast set exceeds 64 items, while most contain considerably fewer taxa than ten.

In conclusion, we would like to urge the testing of superficially shallow taxonomic hierarchies for the presence of unlabeled midlevel taxa. We believe that our evidence shows that such taxa cannot be ignored as insignificant. In the present paper we have outlined several procedures by which the investigation of such hierarchies can be carried out, but doubtless many others can and eventually will be devised. A recognition of the existence and an evaluation of the taxonomic status of such unlabeled categories will usually be found to lead to a more psychologically revealing and culturally meaningful description of the underlying conceptual structure of a particular domain, a structure that may otherwise remain obscure.[8]

NOTES

[1] This research has been financed by the National Science Foundation under the following grants: NSF GS 383, "Comparative ethnobotany of two Tzeltal speaking communities," A. Kimball Romney and Peter H. Raven, Co-principal investigators; NSF GS 1183, "Studies in Tzeltal botanical ethnography," Brent Berlin and Peter H. Raven, Co-principal investigators. This support is gratefully acknowledged. The work is being carried out primarily in the Tzeltal-speaking municipio of Tenejapa, Chiapas, Mexico, although new research is being undertaken in several additional Tzeltal dialects. A general statement of the physical characteristics of the area is given in Berlin, Breedlove, and Raven (1966). Relevant bibliographic material on linguistic, ethnographic, or botanical work completed or now in progress in highland Chiapas may be obtained by writing the authors.

[2] There is some evidence that the noun+noun compounds *teʔakʼ* (*teʔ* [*tree*]+*ʔakʼ* [*vine*]) and *čanbalam* (*čan* [*snake*]+*balam* [tiger]) function as lexical items indicating "plants" and "animals" respectively. A report to this effect is given in Metzger and Williams (1966). We have been able to verify this finding for two Tzeltal informants. However, long periods of elicitation with many additional informants lead us to question the widespread applicability of these forms with the general meanings "plants" and "animals." The vast majority of our informants indicate that *teʔakʼ* more appropriately designates "forest" or "woods" while *čanbalam* refers only to a small subset of large four-legged mammals.

[3] An interest in unlabeled categories is not new to ethnoscience, although the taxonomic significance of such categories has not been systematically explored.

D'Andrade (n.d.) in one of the first papers on Tzeltal botanical ethnography searched for unnamed categories in another dialect of Tzeltal. His intuitions were stated as follows:

> Are there sub-groupings in the taxonomic system at a lower level of contrast than the lowest set of general terms, but at a higher level of contrast than the most specific terms? . . . Is it really true that no further subdivisions are consistently made since there are no [labels] for these subdivisions. . . . It would seem likely that these large groups of plants are to some extent sub-divided, or at least cross-indexed, to make for a more efficient mapping [D'Andrade n.d.:1].

D'Andrade's conclusions were tentative, and recognized as such, but there were clear indications that midlevel categories could be isolated. These categories appeared to be determined primarily in terms of sets of certain morphological features of individual plant taxa.

Whiting (1939) presents some tentative evidence for unnamed categories of plants in Hopi. French (1956) describes Wasco folk botany as lacking midlevel categories of plants but states that "implicit categories" may be present. Bulmer and Tyler's (in press) work on frogs and Acheson's (n.d.) materials on birds are recent examples dealing with ethnozoological unlabeled taxa. Black (1968) argues for the presence of an unlabeled taxon in her recent work on Ojibwa. Goodenough (1956) explicitly identifies unnamed categories of a paradigmatic nature in his treatment of Trukese kinship and later (1965) presents evidence for unlabeled classes with taxonomic significance for American English kinship terms. After this paper had been drafted, Paul Kay brought to our attention a personal communication from William Geoghegan that is analogous to Keesing's (1966:23) remarks and identical to the point at issue in this paper. Geoghegan, taking issue with a point developed in Kay (1966:22), notes: "Why must every node in a taxonomy correspond to a lexeme? Analytically this may be so, due to the way in which analysis proceeds. But cognitively (my bias again) there is no reason to suppose this, and it probably isn't true in fact."

Finally, several recent papers have shown that important domains such as color (Conklin 1955) and categories of eating (Landar 1964; Berlin 1967) need not be labeled linguistically by a single monolexemic head-term.

[4] The discovery of semantic features, or "characters," that are utilized by native speakers in making judgments of similarity is one of the major goals of ethnoscientific research. We do not believe, however that a prior knowledge of these features is a *prerequisite* to the recognition of semantically related sets of items. Informants, in the field and in quasi-experimental situations, continually volunteered the fact that items "*A*, *B*, and *C* go together," or "are companions." Consequently we feel that as an operational procedure it is desirable at the outset to request that informants make judgments in terms of *overall similarity* without specifying some set of specific features. Berlin (in press) and Berlin and Romney (1964) offer discussions of these procedures in reference to other kinds of linguistic data. Romney and D'Andrade (1964) discuss this problem in reference to the applicability of the method of triads-testing discussed earlier. Sokal (1966) presents a lucid account of problems dealing with over-all similarity in reference to biological classification in general.

[5] It is assumed, of course, that the informant can read and write his native language with relative ease. Much of the most productive work in ethnoscience depends, in fact, on the use of literate informants (see Metzger and Williams 1963a, 1963b, 1966; Berlin in press; Berlin, Kay, Metzger and Williams n.d., and many other unpublished manuscripts of the work in progress in Chiapas growing out of the Chicago, Harvard, and Stanford projects in that area over the last ten years). Clearly, considerable effort on the part of the ethnographer is required in developing a practical phonemic orthography, training informants to use it, and making certain that many quasi-experimental tasks are understood. We feel the results far outweigh the loss of research time. The use of skilled informants has drawn criticism from certain areas of cultural anthropology. There are those who look askance at the reliance on highly trained native assistants for fear that their training somehow effects the validity of the results. We are aware of these problems and do not take them lightly. However, without such training an informant will be unable to make available to the investigator many of his native intuitions about his own culture, intuitions that are perhaps forever outside the grasp of even the most perceptive ethnographer.

[6] A. Kimball Romney is currently developing a computer program that will allow significantly large numbers of items to be grouped into smaller conceptual subsets. After the research reported here was completed, we learned of a field procedure developed by William Geoghegan that allows one to utilize the triads mentioned on very large numbers of items without the aid of mechanical processing.

[7] It so happens that the Tzeltal forms in this set correspond fairly closely to recognized botanical species, with the obvious exception of *Lagenaria siceraria*, which is overdifferentiated. Such one-to-one correspondence is rather rarely the case (Berlin, Breedlove, and Raven 1966). The English and Latin glosses for the Tzeltal names are approximations only and apply specifically to the forms of these exceedingly variable species most familiar to Tzeltal speakers.

In Berlin, Breedlove, and Raven (1966) we reported that *Lagenaria siceraria* corresponded to the Tzeltal taxa *k'atk'at bohč*, *sepsep bohč*, *cu*, and *č'ahk'oˀ*. This data represented a normalization for all informants consulted. The illustrative data utilized for the present paper were derived from an informant who lacks subclasses of *bohč* (the shape varietals *k'atk'at bohč* and *sepsep bohč* not being recognized) and does not group *č'ahk'oˀ* as a member of the set of conceptually related gourds and squashes. We speculate that its exclusion from the set is due to the fact that the individuals of *Lagenaria siceraria* that are called *č'ahk'oˀ* are "genetic throwbacks" that are not easily recognizable as gourds.

[8] We greatly appreciate the criticisms of H. C. Conklin, George Cowgill, Marshall Durbin, William Geoghegan, Richard W. Holm, Terrence Kaufman, Paul Kay, A. Kimball Romney, David Schneider, and William Sturtevant. Kay has been especially helpful in the preparation of the final draft.

REFERENCES CITED

Acheson, Nicholas H.
n.d. The ethnozoology of the Zinacantan Indians. ms.
Berlin, Brent
In press Tzeltal numeral classifiers: a study in

ethnographic semantics. Janua Linguarum 70 (series practica). The Hague, Mouton and Company.
1967 Categories of eating in Tzeltal and Navaho. International Journal of American Linguistics 33:1–6.

BERLIN, BRENT, DENNIS E. BREEDLOVE, AND PETER H. RAVEN
1966 Folk taxonomies and biological classification. Science 154:273–275.
In preparation. Studies in Tzeltal botanical ethnography: principles of classification.

BERLIN, BRENT, PAUL KAY, DUANE METZGER, AND GERALD WILLIAMS
n.d. A proposal for a summer institute of ethnography. Unpublished ms.

BERLIN, BRENT, AND A. KIMBALL ROMNEY
1964 The descriptive semantics of Tzeltal numeral classifiers. *In* Transcultural studies in cognition. A. Kimball Romney and Roy Goodwin D'Andrade, eds. American Anthropologist 66(3), pt. 2:79–98.

BLACK, MARY
1968 Eliciting folk taxonomy in Ojibwa. *In* Cognitive anthropology. Steven Tyler, ed. New York, Holt, Rinehart & Winston.

BULMER, RALPH, AND MICHAEL J. TYLER
In press. The classification of frogs by the Karam of the Kaironk Valley, New Guinea. Journal of the Polynesian Society.

COLBY, B. N.
1966 Ethnographic semantics: a preliminary survey. Current Anthropology 7:3–32.

CONKLIN, HAROLD C.
1954 The relation of Hanunóo culture to the plant world. Unpublished Ph.D. dissertation in anthropology, Yale University.
1955 Hanunóo color categories. Southwestern Journal of Anthropology 11:339–344.
1962a Lexicographical treatment of folk taxonomies. *In* Problems in Lexicography. F. W. Householder and S. Saporta, eds. Indiana University Research Center in Anthropology, Folklore, and Linguistics Publication 21. Pp. 119–141.
1962b Comment [on Frake 1962]. *In* Anthropology and Human Behavior. T. Gladwin and W. C. Sturtevant, eds. Washington, Anthropological Society of Washington. Pp. 86–91.
1964 Ethnogenealogical method. *In* Explorations in Cultural Anthropology: Essays Presented to George Peter Murdock. W. H. Goodenough, ed. New York, McGraw-Hill. Pp. 25–56.

D'ANDRADE, ROY G.
n.d. [Report on Aguacatenango Tzeltal ethnobotany] unpublished ms.

DAVIS, P. H. AND V. H. HEYWOOD
1963 Principles of angiosperm taxonomy. Edinburgh and London, Oliver and Boyd.

DURBIN, MARSHALL
1966 The goals of ethnoscience. Anthropological Linguistics 8(8):22–41.

FRAKE, CHARLES O.
1961 The diagnosis of disease among the Subanun of Mindanao. American Anthropologist 63:113–132.
1962 The ethnographic study of cognitive systems. *In* Anthropology and Human Behavior. T. Gladwin and W. C. Sturtevant, eds. Washington, Anthropological Society of Washington, Pp. 72–85, 91–93.

FRENCH, DAVID
1956 An exploration of Wasco ethnoscience. Yearbook of the American Philosophical Society. Pp. 224–226.

GOODENOUGH, WARD H.
1956 Componential analysis and the study of meaning. Language 32:195–216.
1965 Yankee kinship terminology: a problem in componential analysis. *In* Formal Semantic Analysis. E. A. Hammel, ed. American Anthropologist 67(5), pt. 2:259–287.

GREGG, J. R.
1954 The language of taxonomy: an application of symbolic logic to the study of classificatory systems. New York, Columbia University Press.

JEFFERY, C. E.
1962 Notes on Cucurbitaceae, including a proposed new classification of the family. Kew Bulletin 15:337–371.

KAY, PAUL
1966 Comment [on Colby 1966]. Current Anthropology 7:20–23.

KEESING, ROGER M.
1966 Comment [on Colby 1966]. Current Anthropology 7:23.

LANDAR, HERBERT
1964 Seven Navaho verbs of eating. International Journal of American Linguistics 30:94–96.

LOUNSBURY, FLOYD G.
1964 The structural analysis of kinship semantics. *In* Proceedings of the Ninth International Congress of Linguistics. Cambridge, M.I.T. Press. Pp. 1073–1099.

METZGER, DUANE AND GERALD E. WILLIAMS
1963a Tenejapa medicine I: the curer. Southwestern Journal of Anthropology 19:216–234.
1963b A formal ethnographic analysis of Tenejapa Ladino weddings. American Anthropologist 65:1076–1101.
1966 Some procedures and results in the study of native categories: Tzeltal "firewood." American Anthropologist 68:389–407.

MILLER, GEORGE A.
1956 The magical number seven, plus or minus two: some limits on our capacity of processing information. Psychological Review 63:81–97.

ROMNEY, A. KIMBALL
n.d. Multidimensional scaling and semantic domains. Unpublished ms.

ROMNEY, A. KIMBALL AND ROY GOODWIN D'ANDRADE
1964 Cognitive aspects of English kin terms. *In* Transcultural studies in cognition. A. Kimball Romney and Roy Goodwin D'Andrade, eds. American Anthropologist 66(3), pt. 2:146–170.

SOKAL, ROBERT R.
1966 Numerical taxonomy. Scientific American 215(6):106–116.

STURTEVANT, WILLIAM C.
1964 Studies in ethnoscience. In Transcultural studies in cognition. A. Kimball Romney and Roy Goodwin D'Andrade, eds. American Anthropologist 66(3) pt. 2:99–131.

WALLACE, A.F.C.
1961 On being just complicated enough. Proceedings of the National Academy of Sciences 47:458–464.

WHITING, A. F.
1939 Ethnobotany of the Hopi. Museum of Northern Arizona Bulletin 15.