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A functional view on prototypes

Hansjakob Seiler

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Prof. Dr. H. Seiler

Institut für Sprachwissenschaft
Universität zu Köln

D-5000 Köln 41

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Hansjakob Seiler, University of Cologne

1. Introduction

The human mind may produce prototypization within virtually any realm of cognition and behavior. A "comparative prototype-typology" might prove to be an interesting field of study - perhaps a new subfield of semiotics. This, however, would presuppose a clear view on the samenesses and differences of prototypization in these various fields. It seems realistic for the time being that the linguist first confine himself to describing prototypization within the realm of language proper.

The literature on prototypes has steadily grown in the past ten years or so. I confine myself to mentioning the volume on Noun Classes and Categorization, edited by C. Craig (1986), which contains a wealth of factual information on the subject, along with some theoretical vistas. By and large, however, linguistic prototype research is still basically in a taxonomic stage - which, of course, represents the precondition for moving beyond. The procedure is largely per ostensionem, and by accumulating examples of prototypes. We still lack a comprehensive prototype theory.

The following pages are intended, not to provide such a theory, but to do the first steps in this direction. Section 2 will feature some elements of a functional theory of prototypes. They have been developed by this author within the frame of the UNITYP model of research on language universals and typology. Section 3 will bring a discussion of prototypization with regard to selected phenomena of a wide range of levels of analysis: Phonology, morphosyntax, speech acts, and the lexicon. Prototypization will finally be studied within one of the universal dimensions, that of APPREHENSION - the linguistic representation of the concepts of objects - as proposed by Seiler (1986).

2. Elements of a functional theory of prototypes

1. The notion of prototype with its content: parametric optimization with regard to a given function (see below, 4.) belongs to the basic premises of any speech activity. It does not in any strict and direct way derive from empirical research. There are, of course, empirical correlates that may serve as heuristics in the search for prototypes: The prototype of a category is most wide-spread cross-linguistically, it is first learned by children, it may be substituted for non-prototypical instances, etc.

2. A prototype is the result of operations that go on in the minds of participants of language communication. The primary goal of the analyst must be to reconstruct these operations. Emphasis is therefore laid not on the result, the "thing", "the prototype", but on the operations, which we shall subsume under the term of prototypization.

3. Prototypization characterizes a particular instantiation of the relation between a repraesentandum (that which is to be represented) and a repraesentans (that which represents) in the process of representation of a conceptual content by a linguistic expression. The relation between a repraesentandum and a repraesentans is called function.

4. Prototypization is the optimization of a function, resulting in high saliency.

5. Prototypization implies parametrization.

6. Prototypization results from optimal options chosen by speakers/hearers from a plurality of options on a plurality of parameters.

7. Prototypization can only be understood and adequatedly described in full cognizance of the entire bandwidth of options for a given function, including the non-prototypical or marginal ones.

8. Prototypes are the epitome of categories.

9. A category is constituted by a bundle of properties/features (intension), and by the set of its members (extension).

10. A property/feature is a principium comparationis and is instantiated by a parameter. The parameter is a scalar ordering of options and represents the range of variation. It is embraced by an invariant.

11. Variation on the parameters is characterized by markedness relationships: either bi-polar: marked-unmarked; or continous: increasing/decreasing markedness, with two extreme poles.

12. There are dependency relations among the properties/features constituting a category.

13. Prototypization involves a hierarchy of levels of categorization and of parametrization. There are basically three levels: 1) superordination, 2) basic, 3) subordinate.

14. The conceptual side of a category (the repraesentandum) is discrete and can be defined by a finite number of properties. The linguistic side of a category (the repraesentans) shows prototypical and non-prototypical (marginal) instantiations in a gradient transition.

3. Discussions of prototypization

3.1. Domains

The tenets under section 2 may be substantiated within different domains and on different levels of linguistic analysis. A more detailed and extensive treatment will be given to one of the universal dimensions of language, viz. that of APPREHENSION (the linguistic representation of objects), as presented by this author (Seiler 1986). Here the overall function of the dimension as well as the functions of the techniques and of the subdimensions have been worked out and definitions are available. The internal structure of the defining parameters (continua) is brought to the fore. A sufficient body of data is also presented.

Before embarking on this enterprise, however, let us briefly look into the situation of some selected phenomena pertaining to such levels as phonology, morphosyntax, the

speech acts, and the lexicon.

3.1.1. Phonology. The superordinate category is that of speech sounds. Vowels vs. consonants are basic categories. Different subclasses of vowels and of consonants are subordinate. It appears that prototypization is prominent on the basic level, i.e. in the class of consonants and in the class of vowels (see 2.13.). These major classes along with the two intermediate classes of liquids and glides have been exhaustively defined by a finite number of features in their appropriate marked vs. unmarked specifications (cf. 2.11.) as bundles of the following form:

True Consonant	Vowel	Liquid	Glide
[+ cons, - voc]	[- cons, + voc]	[+ cons, + voc]	[- cons, - voc]
e.g. /p/	/a/	/l/	/y/

(Jakobson and Halle 1956: 29 f.). Problems with these features have been pointed out by Chomsky and Halle (1968: 354), and different feature specifications were proposed. For our present purpose we might disregard these differences and retain the fact that basic classes of speech sounds have been defined as bundles of features.

When phonologists speak of "optimal" or prototypical vowels vs. consonants, the respective function of these classes comes into play (cf. 2.4.): "Syllables are the fundamental divisions of any sequence, and in all languages they follow a clearcut constructional model which consists of a nucleus ... and margins. Vowels function in languages as the only or at least as the most usual carriers of the syllabic nuclei, whereas the margins of syllables are occupied chiefly or solely by consonants." (Jakobson and Waugh 1979: 85 f.). An optimization of these two contrasting functions is obtained respectively by an appropriate bundling and specification of distinctive features (cf. 2.9.). The need for sonority of a syllable nucleus is met by the closer connection of the sonority (or chromaticity) axis with vocalism whereas syllable margins favor the closer connec-

tion of the tonality axis with consonantism. Correspondingly, the compact-diffuse relation is the fundamental axis of the vocalic system, and the optimal and thus unmarked vowel is the pole of compactness (/a/). Conversely, the compact-diffuse relation is accessory in respect to consonantism, and the pole of compactness shows a marked consonant (/k/). On the other hand, the optimal unmarked consonant is highly diffuse and minimally compact (/p/). "Primarily, optimal vowel phonemes are voiced, in contradistinction to the optimal voiceless consonants; secondarily, optimal vowel phonemes are tense and therefore particularily distinct, in contrast to the optimal, lax consonants" (Jakobson and Waugh 1979: 135 ff.). Although the justification for what are the primary and the secondary feature specifications is not always as clear, it remains that there is a certain amount of dependency and hierarchization in the constitution of these respective sound classes (cf. 2.12.). We retain that the distinctive features are principia comparationis instantiated by parameters (cf. 2.10.) with two poles, one carrying the mark, the other lacking it. The parameters constituting the categories of the levels above the phonemic are also bi-polar, but normally show intermediate stations. In spite of this difference it is precisely the similarity in the processes of prototypization which suggests that both kinds of parameter be subsumed under a common invariant.

3.1.2. Morphosyntax: The noun/verb [N/V] distinction.

First a general note on the nature of grammatical categories and on the problem of their universality. We are indebted to the clarifying views of E. Coseriu (e.g. 1974: 49 ff.). When a linguist examines the distinction between N and V in a language L_x he consciously or inconsciously starts from certain assumptions or expectations about Ns and Vs and their defining properties. In other words he applies certain conceptualizations about Ns and Vs, and he applies them in principle to any language in order to look and see how these conceptualizations are materialized, e.g., in L_x, L_y, etc. In this sense, the categories of N and V - and any

other grammatical categories as applied by linguists - are universal and their definition must be universal. Such definitions constitute the necessary tertium comparationis that enables the linguist to speak of Ns and Vs in different languages L_x, L_y, etc. and thus to write grammars that can be compared with one another. Categories are thus defined as possibilities for languages, with no claim implied about their being materialized in all the languages of the world (Coseriu, ibid.). This should end the eternal quibble about whether or not Ns and Vs are found "in every language". In fact, they need not be, and in some languages the distinction is minimalized to a point where one might prefer to posit one single category of "content words" instead.

The past few years have seen the appearance of a number of important contributions to the topic of N/V distinction: H. Walter (1981); P.J. Hopper and S.A. Thompson (1984); R.W. Langacker (1987); J. Broschart (1987). The works of Walter and Broschart are based on the UNITYP model.

For UNITYP the N/V distinction is one of the techniques within the dimension of PARTICIPATION (Seiler 1984). A systematic discussion of this technique will be presented in a comprehensive treatment of PARTICIPATION (Seiler forthcoming). Only a few points shall be highlighted in the present context of prototypization.

1. Function. The overall function of PARTICIPATION consists in the representation of a relation, the relation between PARTICIPANTS and a PARTICIPATUM ("that which is participated in"). The PARTICIPATUM is that term of the relation which - partly or totally - includes reference to the relation as a whole, and hence also to the PARTICIPANT(S) (inherent relation). The technique of N/V distinction is close to the indicative pole of the dimension, which means that inherence of the relation is more or less taken for granted, while in a more predicative technique such as Complex Sentences the relationship is made much more explicit. While N/V distinction is low in predicativity, it is correspond-

ingly high in indicativity, and this includes an essential association with pragmatic factors of discourse and context. This is basically in accordance with the findings of Hopper and Thompson (1984). The function corresponding to N/V distinction is optimally served when PARTICIPATUM and PARTICIPANT(S) are respectively represented by terms of high formal and semantic saliency in paradigmatic contrast, without the addition of further syntagmatic material.

2. Correlativity. This point deserves particular attention: Nouns and Verbs are correlative categories. It does not make any sense to speak of nouns without at the same time considering verbs, and vice versa - just as the category of vowels cannot be adequately described without reference to the consonants. And just as the distinction of these two basic classes of speech sounds is described in terms of some parameters common to both, so we need a set of parameters where some are common to both N and V in order to adequately account for the prototypization of these two correlative categories.

3. The defining parameters. 1) The parameter of relationality: relational vs. absolute. The optimal V is highly relational, which means: involving participants, and is minimally absolute. In many languages the PARTICIPANT(S) is/are inherent in the verb, either with or even without an incorporated agreeing element, and no further specification of nominals is needed for a clause to be complete. The optimal N is highly absolute and minimally relational. 2) The identity parameter: referential vs. non-referential. Optimal Ns are highly referential, definite and specific. Optimal Vs are non-referential, but highly general. 3) The stability parameter: time-stable vs. time-unstable. Optimal Ns are highly time-stable, i.e. do not admit differentiation with regard to the time axis. Optimal Vs show the opposite characteristics.

I do not claim that these necessary parameters are also sufficient to exhaustively define the N/V distinction. However, I hope we are now in a position to show what it means

to say that prototypes are optimal bundlings of defining parameters (cf. 2.4. and 2.9.). The optimal bundling of parameters 1) to 3) would be: highly relational/highly general/highly time-unstable for Vs, and highly absolute/highly referential/highly time-stable for Ns. Now, optimality and prototypicality is an option among others. As we lower optimality on one or several of the parameters we gradually move away from prototypicality. In our particular case this means that the N/V distinction is weakened. This process can be observed both within a single language and in cross-language comparison. Relevant exemplification can be found in all three works cited above, with regard to parameters especially in Broschart (1987). When non-optimality is reached on all defining parameters "we end up with basically one class of general property words which class-internally may show certain preferences of contextual use, but only a handful of absolute restrictions" (Broschart 1987: 80).

A final word on markedness: Variation on the parameters is characterized by markedness relationships (2.11.). At first sight one would assume that in a parameter "relational vs. absolute" the former is marked, the latter unmarked, once and forever. However, in parameters such as this one which correlatively acccomodate both Ns and Vs it is the case that one extreme: "relational", has the mark for Ns and is unmarked for Vs, while the other extreme: "absolute", has the mark for Vs and is unmarked for Ns.

3.1.3. Speech acts: In his enlightening contribution to the problem of prototypes T. Givón has successfully counteracted the still widespread tendency of looking only at the prototype peaks while neglecting the other, non-prototypical or atypical manifestations (Givón 1986: 94 ff.). The four speech acts generally recognized in any language and syntactically coded as, respectively, (a) declarative, (b) imperative, (c) interrogative (i) WH-question, (ii) Yes/No question, he correlates with one another under the common denominator of a cluster of "socio-psychological" parameters which span a continuum leading from the prototypical syntax of one speech act

to the prototypical syntax of its correlate. Here is an example (Givón, op. cit. 95):

"(20) From imperative to yes/no question:
[most prototypical imperative]
(a) Pass the salt!
(b) Please pass the salt.
(c) Pass the salt, would you please?
(d) Would you please pass the salt?
(e) Could you please pass the salt?
(f) Can you please pass the salt?
(g) Do you see the salt?
(h) Is there any salt around?
[most prototypical interrogative]
The two extremes on the scale, (20a) and (20h) can respond most closely to their respective speech-act prototypes both semantically/functionally and syntactically. In contrast, the two most clear intermediate points on the semantic continuum, (20c) and (20d), also show intermediate syntactic properties."

The parameters or "dimensions" which comprise the semantic/functional space along which syntactic codings of speech acts receive a natural ordering are provisionally determined as follows (Givón, op. cit. 96):

"(21) a. The power/authority gradient between speaker and hearer
b. The speaker's urgency in eliciting action
c. The speaker's ignorance in eliciting verbal response
At the top of scale (20)-(20a) - the value of (21b) is highest, (21c) lowest and the power gradient (21a) tips toward the speaker. At the bottom of the scale - (20h) - the value of (21b) is lowest, the value of (21c) is highest and the power gradient in (21a) tips toward the hearer."

In a similar way Givón (p. 96 ff.) presents us with continua "from imperative to declarative", and "from declarative to yes/no question", each with its appropriate "socio-psychological" parameter(s). The prototypical syntactic representation of the imperative, e.g., would then result as a cluster of the syntactic optima within each of the "dimensions" where imperative appears as one of the correlates.

In summing up the results from section 3.1. thus far, the following analogies between classes of speech sounds, basic grammatical categories, and classes of speech acts can be stated:

1. Categories or classes are constituted by a number of parameters, each comprising a number of options ordered on the basis of markedness relations in a continuum with two poles and eventually with intermediate steps (cf. 2.9.-11.).
2. The parameters which constitute a category interact with one another. "Bundling" was the expression used for such interaction in phonology (Bloomfield 1933: 79; Jakobson and Waugh 1979: 19 f.). This metaphor can now be replaced by a more precise notion: The decisive point of "bundling" or "meeting" of the constitutive parameters is "the prototype", i.e. that instantiation of the category where all the parameter options are optimal for the given function of the category.
3. As the choice of options on one or several of the parameters moves away from optimality, the categorial representation of the given function moves toward marginality.
4. Irrespective of absolute markedness values within each parameter it is the superordinated function of the category that determines that the optimal value is always unmarked. This may involve a reversal of markedness.
5. As there is correlativity among categories, such as vowel/consonant, N/V, imperative/interrogative, or, generally speaking, A/A', at least some of the constituting parameters are common to both correlates, where the optimal, unmarked value for category A is the least optimal, marked one for category A', and vice versa.

3.1.4. Lexicon

We must confine ourselves to a few general remarks.

In the wake of E. Rosch's seminal work on human cognition and categorization (Rosch 1977, 1978 for references) many linguists insist that human categorization in general and linguistic categorization in particular - where the lexicon received particular attention - lack well-defined bound-

aries (Lakoff 1973: 458 ff.; 1986: 43 ff.). "Fuzziness" is the magic word. Even upon cursory reflection it should be clear that a statement of fuzziness, no matter whether true or false, necessarily presupposes knowledge of a basis of comparison which in itself is not fuzzy, thus which does have well-defined boundaries. There is something in human, particularly lexical categorization which does have well-defined boundaries, and something which is fuzzy.

How can this paradox be resolved? Let us try it with an example, the much discussed "meaning of bird" (Rosch 1975: 193; Lakoff 1973: 458; Wierzbicka 1985: 180, and forthcoming, "example 4"). What the participants in the great debate seem to have in common is that they can reasonably argue about the inclusion or exclusion of a particular animal in the category. There may be disagreement, not only about inclusion but even about the pertinent criteria; nevertheless, well-defined boundaries and criteria are the necessary background of such discussion.

It is actually possible to define the concept underlying the English word bird, or at least to reasonably argue about such a definition, e.g. whether flying is an essential part of it, alongside components referring to feathers, beaks, eggs, and nests (cf. Wierzbicka 1985: 180, and this volume, l.c.). One would certainly agree with Wierzbicka forthcoming, l.c.) that bats "are no more birds than cows are, but oistriches and emus - which do not fly - ARE birds". One would also agree with Lakoff (1986: 33) that "robins and sparrows are typical birds." Such statements and discussions relate to the concept underlying the English word bird. Defining concepts is, after all, a fundamental activity of the human mind, where the scientific, in our case the zoological definition, is only a special case of such activity. It is also possible to define the concept underlying the word for 'bird' in such other languages as, e.g., the Australian Nunggubuyu (Wierzbicka, forthcoming, Note 2) where bats as well as grasshoppers are included. - The gist of our argument is that the result of such activities, i.e. the concepts defined, may be subject to debate and to eventual revision, whereas

the mental operations involved in defining a concept aim at discreteness and at well-defined borders. The character of such operations is, in principle, an onomasiological one; it is further more abductive, proceeding, that is, by advancing hypotheses and by subsequent testing.

Now, defining a concept underlying the English word bird should be carefully distinguished from describing the meaning of that English word. The relevant operations here are semasiological, and are of an inductive character, proceeding by way of generalization and eventually arriving at a common denominator. Unfortunately, the difference between defining the concept underlying a word and describing its meaning is still widely ignored. The most incisive formulation of this difference under the respective terms of Bezeichnung vs. Bedeutung has been worked out by E. Coseriu in several of his earlier and more recent publications (see, e.g. Coseriu 1973: 1 ff.; 1987: 1 ff.).

Describing the meaning of bird involves, above all, noticing its contextual variants and bringing them into an order. Here the masses of texts and of contextual uses within one language, in our case English, are the primum datum. An overview can be gained from the respective dictionary article. We find that some of the parameters of the proposed conceptual definitions of bird are over-extended, such as when bird is applied to humans - e.g. for 'girl' (slang), or as in birds of a feather 'peole of like character'; or when some parameters show up that were neglected in the hither to proposed definitions, such as the bird's vocal productions - e.g. in a little bird for 'source of information not to be disclosed' or in get/give the bird for 'disapproval by hissing, booing', etc. In sum, describing the meaning of bird brings to light metaphorical and other over-extensions, over-emphasis of certain components at the detriment of others, fuzzy boundaries - a considerable range of variation.

Now, variation is unthinkable without admitting a common denominator. In fact, it is possible, by way of generalization, to arrive at such an invariant - for bird as well as for any other word. The resolution of the above formulated

paradox lies in the fact that conceptual definition and description of a meaning invariant are not disparate operations: There is an interface between them. The clearest manifestation of such an interface appears when we compare the English word bird with its variational range of meanings with the word for 'bird' in Nuggubuyu with its different range of meanings - an activity which is at the basis of any translation.

3.2. Universal Dimensions

3.2.1. Generalities

The title refers to functional dimensions as proposed by the UNITYP research group. They embrace phenomena that may differ from one another both in form and in meaning, phenomena that relate to all levels of linguistic analysis. The phenomena are dimensionally ordered, and the order holds both for one particular language and cross-linguistically. The superordinated functional denominators constitute the names of the following dimensions proposed thus far: APPREHENSION - the linguistic representation of the concepts of objects (Seiler 1986); POSSESSION (Seiler 1983); DETERMINATION (Seiler 1978 and 1985); NOMINATION - formerly: descriptivity - (Seiler 1975); PARTICIPATION (Seiler 1984).

Our exemplification here will be drawn from the dimension of APPREHENSION. The ordering of the linguistic data follows two converse functional principles: indicativity vs. predicativity. Applied to the dimension of APPREHENSION indicativity means the following: The object is apprehended by pointing it out; to indicate means to point (deixis). The pointed out object is an individualized object. Predicativity means: The object is apprehended by predicating about it, its properties, manifestations, and the like. Predicativity is syntactically manifested as relationality. A relation is general, not individual. The predicated object is a generalized object. The co-presence of the two functional principles: indicativity vs. predicativity in the linguistic - and cognitive - apprehension of objects is reflected in Aristotle's

appraisal that a 'thing' ia at the same time a 'such' and a 'this' (citations in Seiler 1986: 17).

The dimension represents an overall parameter or continuum. The UNITYP dimensional model features parametrization in three hierarchical levels: 1) dimensions (superordinate), 2) techniques (basic), 3) subdimensions (subordinate). Prototypization seems to preferably occur on the basic level of tequniques. With this situation one may compare E. Rosch's and B. Tversky's findings about a basic level of categorization in human cognition (Rosch 1978; Tversky 1986). Each of the techniques has its particular function and is constituted by a bundle of parameters (subdimensions), the bundling being commanded by the convergence point of the optima of the parameters - in other words: by the prototype. Within each technique both functional principles are active, but at different degrees of dominance: Predicativity predominates at the leftmost pole of the dimension, viz. within the technique of ABSTRACTION - however, with indicativity not being totally absent. Indicativity predominates at the rightmost pole, viz. within the technique of NAMEGIVING - however, with predicativity not being totally absent. For further details the reader should be referred to Seiler 1986.

The so-called classificatory techniques that we shall now inspect more closely occupy a medial space within the dimension.

3.2.2. Numeral Classification and other classificatory techniques

3.2.2.1. Generalities. Classification occurs as a component of several techniques pertaining to several different functional dimensions: APPREHENSION - the linguistic representation of the concepts of objects - is one (Seiler 1986); POSSESSION - the linguistic representation of the relation of appurtenance - is another (Seiler 1983); aspectual classification and argument structure (our dimension of PARTICIPATION) is a third (Silverstein 1986). A true insight into the workings of classification in each of these cases can only come from an understanding of their respective functional

context.

Within the dimension of APPREHENSION I have distinguished the following classificatory techniques in the following order: Classification by Verbs, Classification by Articles, Numeral Classication. Their ordering is determined by a decrease in predicativity and an increase in indicativity. The technique adjacent to Numeral Classification, viz. Agreement in Gender and Number also shows a classificatory aspect, although here classification is subservient to agreement which fulfills the function of indexing and reference. Again, within each of the techniques mentioned classification has a somewhat different role, and we expect that prototypization of class membership is different, too.

3.2.2.2. Numeral Classification

This technique is spread over a vast geographical area - roughly circum-Pacific - and is encountered in a great number of languages of quite diversified structure. Nevertheless it is possible to formulate a common functional denominator for all of the numeral classifier constructions. It is determined by the ratio between the two functional principles, i.e. between a predicative/generalized vs. an indicative/individualized representation of objects: These languages show an extended area of neutrality where an unclassified noun does not represent any object at all, but a species or concept. This is why an isolated noun in these languages cannot be directly combined with a quantifier (numeral), since only individuals, not concepts, can be counted. The primary function of classifier constructions is individualization. The task is fulfilled by the operation of classification whereby the N is subsumed under a property concept as represented by the classifier (CLF), and is thus made countable.

As all the other techniques of APPREHENSION, Numeral Classification is multi-factorial. I have posited seven parameters defining this technique (Seiler 1986: 98 f.):
1. Neutrality. Unclassified nouns, i.e. nouns appearing outside of numeral or related contexts are transnumeral, i.e. neutral with regard to distinctions between singular, dual,

and plural. Most classifier languages do not show grammatical number distinctions. This accounts for the impossibility in these languages of any direct collocation of quantifier-noun (Q-N).

2. The context is basically that of numeration (counting), where CLF is obligatory. Other possible contexts are: demonstrative (optional), and qualifier (infrequent).

3. The constituent structure is such that, irrespective of variations in word order, Q and CLF are never separated. This shows that quantification and classification are intimately linked with one another.

4. Classification. This is, be it reminded, an operation, an operation of subsumption, such that the unclassified N falls under a concept X. It is not an operation of qualification - in contradistinction to attribution; nor is it an operation of indexing - in contradistinction to the technique of Gender Agreement.

5. Solidarity between CLF and the classified N. In principle the relation between CLF and N is one-many; i.e. one given N takes one CLF, but one and the same CLF classifies many Ns. Solidarity means that the classification is based on some property that essentially has to do with some properties of the object as represented by the N. The rationale of this connection of properties may vary from one N to another. This in turn means that the criteria for classification are subject to variation.

There are, of course, dependency relations among these parameters (cf. 2.12.). The primary one seems to be number 1, neutrality, on which the others depend. Specifically, it represents the problem to be solved, while number 4 classification and number 5 solidarity represent the answer. As they interact with one another, a certain conflict is preprogrammed: In number 4 the classification regards the N, i.e. the word representing the object, not the object itself. The operation thus seems to be a predominantly metalinguistic one. In number 5 the solidarity between CLF and N is based on some properties of the represented object. This then points to objectlinguistic operations. As parameters 4 and 5 are equally constitutive for the solution of the problem, we pre-

dict that prototypization within the technique of Numeral Classification will come out with a mean mid between the two; in other words, it will show classes that are mildly, but not overly heterogeneous with regard to properties of the objects as represented by the Ns.

Extreme, non-prototypical realisations of Numeral Classification we obtain when either parameter 4 or parameter 5 is overextended or "stetched". First, three examples for overextension of the metalinguistic aspect:

1. For Garo, a Tibeto-Burmese language of Western Assam, K. Adams and F. Conklin (1973: 2) report the following situation: "... stone, ball, eye, coin, and fruit are all included in one class based on their roundedness. This class also includes banana, although it is not round (like oranges, mangos, etc.), because all other fruits are in this class." Does this mean that the Garo show a peculiar, exotic indifference vis-à-vis the shape distinction between round vs. oblong objects, in other words: would they be unable to cognitively classify bananas among the long, not among the round objects? Certainly not. What happened in their linguistic classifier system is a shift of criterion from 'roundedness' to 'fruitness'. Given the overall context as described by the authors, the shift makes perfect sense, it is well "motivated". G. Lakoff (1986: 18 ff.) is right in putting emphasis on the distinction "between giving principles that motivate, or make sense of, a system, and giving principles that generate, or predict, a system." But he errs when he concludes that "categories on the whole need not be defined by common properties" (op. cit.: 17). How else could they be defined, if not by common properties? The technique of Numeral Classification can be defined, as we have shown, by a set of properties embodied in five interacting parameters. The parameters show that it is not the purpose of this technique to simply classify the objects "out there" (object-linguistically). Rather, the purpose is to classify Ns (metalinguistically) in a solidarity relation between CLF and N based on some properties of the object represented by N - which allows for changing motivations and thus, if one looks only at the objects, in apparently heterogeneous classes.

2. Still more extreme seems to be a case in Vietnamese as reported by A. Weidert (forthcoming): CLF thó-t is used with Ns for 'elephant', 'garden', and 'raft'; CLF tâ'm is used with Ns for 'bolt of cloth', 'board' or 'plank', 'hide', 'photograph', 'ticket', 'mirror', 'heart', 'example'.

3. The metalinguistic aspect of Numeral Classification appears patently in the so-called repeater constructions where the N and the CLF are represented by one and the same lexeme, and which is thus plainly tautological, as, e.g. in Thai:

(1) prathêet sǎam prathêet "three countries"
THAI country three CLF:country

No information about properties of the "object out there" is supplied by the CLF.

Now an example for an overextension of parameter 5, which results in the opposite extreme: CLFs highly informative about properties of the object and fairly homogeneous classes of objects. The so-called temporary classification is attested in Middle and South American Indian languages, and especially well in Tzeltal, a Mayan language, where it has been studied in detail (Berlin 1968; Serzisko 1980 and 1982). An instructive example, taken from B. Berlin's book on Tzeltal numeral classifiers (1968: 39) is this:

(2) ho -b'ehč' laso
TZEL five-CLF1 rope
"laso in the state of five sequential wraps around a long non-flexible object"

(3) ho -hiht' laso
TZEL five-CLF2 rope
"laso in five lash loops around two pieces of long non-flexible object at 90° angles to one another, as in fence making"

Here, classifiers CLF 1 and CLF 2 do add a great deal of information about the "object out there"; in fact all that is contained in the glosses beside the numeral and the word for rope. In view of this, it has even been proposed (Berlin and Romney 1964: 79) that the classifier ought to be rather considered as a nominal qualifier like an adjective. However, I

think Serzisko (op. cit.) is right in considering the examples as manifestations of classifier constructions on the grounds (a) that they belong to the same substitution class, and (b) that they cannot occur together with inherent classifiers. After all, classifiers CLF1 and CLF2 above do and, apparently, must occur in counting contexts, and they do constitute a class of nouns, which, beside 'laso' includes the word for 'cord', 'vine', 'grass', and 'belt', thus "slender flexible objects" (Berlin 1968: 37). The relation between N and CLF is one of solidarity, where a classifier and a classified noun and their meanings reciprocally condition each other. Tzeltal shows an exceedingly high number of classifiers - over 500 - with noun classes that are small in number and that correspond well with properties of the represented objects.

As all these extreme cases of Numeral Classification show, it would not do to define the technique, and the resulting category, solely on the basis of its prototypical manifestations (cf. 2.7.), because this would mean that the Garo, Vietnamese, and Tzeltal cases would have to be excluded, which, however, would run against the remainder of available morphosyntactic and semantic evidence. The entire range of variation must be covered by the definition of a category.

As noted before, the prototype of Numeral Classification must lie somewhere between these extremes. To determine its exact location we need to look at the entire range of the superordinated dimension of APPREHENSION and compare the technique with its immediate and its more distant "neighbors", in the direction of both greater predicativity and greater indicativity. Such comparative work should now be possible along the lines layed down in my work on APPREHENSION (Seiler 1986). In the framework of the present paper a few glimpses will have to suffice.

3.2.2.3. Numeral Classification and Mass and Measure

Measuring is a kind of interaction between humans and objects, more specifically: continuous objects or masses. There are different kinds of masses, and we interact differ-

ently with them: When we want to measure liquids we put them into cups or gallons or pints, grain we put into sacks, etc. We expect that the function of the linguistic representation of such activities includes particular attention to the properties of the represented objects.

In the technique of Mass and Measure we have two directionalities of the operation: In the dissociative measure construction an object is represented as a mass, a quale, by the very fact that a certain portion or quantum is being dissociated from it. In the associative container construction a quantum is represented as having boundaries and shape and other qualities, and thus the object appears again as a mass. The qualitative (predicative) aspect prevails. This makes it understandable that the qualities in the linguistic representation of the objects match the qualities of "the real world".

As J. Greenberg (1972) has shown, classifier constructions and mass/measure constructions show comparable or identical structures in many languages. Thus, in Thai

(4) rôm sǎam khan
THAI umbrella three CLF:long, handled object
"three umbrellas"

a classifier construction, as compared with

(5) phâafâaj sâam pháp
THAI cotton three MENS:roll
"three rolls of cotton"

a measure construction. Examples and interpretation are from H. Hundius and U. Kölver (1983: 166 f.). As U. Kölver has convincingly shown in several of her publications (e.g. 1982: 162 ff.), classifier constructions, as in (4), are both formally and semantically distinct from measure constructions, as in (5). For one thing, measure terms (mensuratives, MENS) express "some notion of quantity which is extrinsic to the lexical content of the head noun; they provide additional information" (Hundius/Kölver, op. cit.: 168). Thus, in the Thai example (l.c. 170)

(6) nâamtaan sǎam kiloo/thûaj/kʂɔn
THAI sugar three kg cup lump

the mensuratives are relatively extrinsic to the lexical content of 'sugar' (on the restrictive "relatively" see below), and they add the new information of differing quantities. - Numeral classifiers, such as khan 'long handled object' in (4) "reflect intrinsic semantic properties of nouns that they are systematically related to" (op. cit. 169). Thus, in principle, they do not add new information about the object, i.e. they are low in predicativity.

A comparison between (6) and the following measure construction of Thai (op. cit. 170) shows that the above statements about extrinsic and intrinsic need to be relativized:

(7) klûaj sǎam kiloo/takrâa/wǐi
THAI banana three kg basket hand

Apparently, bananas and sugar may either both take kg as a mensurative, or they take different mensuratives such as 'cup', 'lump' for sugar vs. 'basket', 'hand' for bananas. And this doubtlessly has to do with the semantic difference between the two head nouns - and with the properties of the objects they represent. There is a classificatory aspect in this, but it is much more in accordance with the properties of the things measured than is classification in Numeral Classification. From which we learn that classification is an operation that works differently according to the purposive function served by the respective techniques. Prototypization differs accordingly.

3.2.2.4. Numeral Classification and Agreement in Gender and Number

For a detailed treatment of this technique the reader is again referred to Seiler 1986 (p. 110 ff.).

Agreement serves a predominantly indexical function. It signals constancy of reference; it conveys the idea that - within the discourse or context - I am still talking about the same object. The object is thus apprehended by signalling its constancy.

Again, the technique, and the resulting category, is constituted by a "bundle" of parameters:

1. The basis of gender is agreement.
2. Gender involves a classification. But the classification is subservient to agreement.
3. Gender is always linked up with number. The noun as characterized by the gender-number amalgam is always individualizable.
4. Semanticity: 4.1. Gender classification is exhaustive. This means that each N must be a member of a particular class. 4.2. Gender classification is in a relation with biological sex. 4.2. Only a small percentage of the objects denoted by nouns of a particular gender are in fact sexually differentiated.
5. Pragmaticity: This involves discourse functions (constancy of reference) and metalinguistic operations (reflections on gender assignment).

If we take the aforementioned definitory parameters together - especially 4. with its subcomponents - we reach the conclusion that, given the overwhelming majority of nouns, viz. the inanimate ones, it is not the purposive function of this technique to convey the idea that N_1 is a man, and N_2 is a woman, and N_3 is neither man nor woman. Rather, we are faced with a highly grammaticalized technique, where semanticity/predicativity is correspondingly low, i.e. says little or nothing about properties of the represented objects. The respective classes of masculine, femininė, neuter are in this sense heterogeneous, and 4.1.-4.3. even lead us to expect that heterogeneity prevails. This is widely confirmed by the facts of languages with gender/number agreement.

G. Lakoff in his treatment of classifiers (1986: 13 ff., 1987) has offered his interpretation and "some speculations" (l.c. 20) regarding the classifier system of Dyirbal. R.M.W. Dixon's discussion of Dyirbal (1986: 105 ff.) - see also the description by the same author in his grammar (1972: 44 ff.) - suggests that classification in this language is intimately linked with referentiality and indexicality. "A noun is normally accompanied by a 'noun marker' that shows its class" (4 classes distinguished), "agrees with it in case, and also yields information on the location of the referent of that

occurence of the noun" (l.c. 45). In several of his publications on the subject, Dixon has quite rightly insisted on the distinction between "the grammatical category of noun classes (including most types of gender system) and the lexico-syntactic phenomenon of noun classification (including numeral classifiers)" (Dixon 1986: 45). Dyirbal shows "a full-blown grammatical noun class system" (op. cit. 110) and as such it is close to Gender Agreement. With regard to properties of the objects "out there" denoted by the nouns, the four classes are patently heterogeneous. I do not deny that good motivations for shifting criteria for the inclusion of this or that noun entity designating this or that disparate object into the class can be adduced (Lakoff 1986: 15 ff.). But I think it is altogether unnecessary to speculate on the coherence of classes including "women, fire, and dangerous things" (Lakoff 1986: 13; 1987), because, in the first place, they are not classes of things, but classes of nouns. "Classifiers as a reflection of mind" is another of Lakoff's suggestive titles (1986: 13), and an entire edifice called "the ecological aspect of mind" (op. cit.: 49) is construed along these lines. Surely, classifiers are a reflection of mind, but in the almost trivial sense in which all of language is a reflection of mind. It is also a near-truism that the reflection is not a direct one. Numeral classifiers cannot be taken at their face value in that they would tell us how the Thai or the Vietnamese people cognitively classify the objects of the "real world". They tell us how the language classifies nouns for the purpose of making them accessible to quantification - and that is a quite different matter. As we have seen, classification within the technique of Mass and Measure has a different function, and within Agreement of Gender/Number the function of classification is again a different one.

The prototype of this last mentioned technique features a small subclass of nouns - humans, and, to a lesser degree, animals - where gender distinction reflects properties of the designated objects; and an overwhelming majority of nouns where the gender distinction does not reflect any coherent classification of objects, or only rudimentary so (see Zubin/Köpcke 1986: 139 ff.).

Yet, overextensions in semanticity of the classificatory parameter do occur. It was said above that metalinguistic activities with regard to gender assignment are part of the defining parameters of this technique. Now, it is precisely in the situation of experiments that overextensions appear. R. Jakobson (1959/1971: 265) reports that "a test in the Moscow Psychological Institute (1915) showed that Russians, prone to personify the weekdays, consistently represented Monday, Tuesday, and Thursday as males, and Wednesday, Friday, and Saturday as females, without realizing that this distribution was due to the masculine gender of the first three names (ponedel-n'ik, vtornik, četverg) as against the feminine gender of the others (sreda, pjatnica, subbota)." When the frame conditions of the experiment are set in such a way that weekdays shall be persons, then the correspondence between their sex and nominal gender comes as no surprise. (For an analogous remark regarding a Roschian experiment see Wierzbicka, this volume, "example 4".) This shows overextension in the classificatory parameter of Gender Agreement. But it is nevertheless part of the facts of language and it can and must be accomodated by the definition of that particular technique.

4. Concluding remarks

The reader is invited to return to our "Elements of a functional prototype theory" (section 2.) and to compare them with the foregoing.

The most important points shall be highlighted here. The inclusion of prototypization into the dimensional model of UNITYP opens up new vistas which ultimately should lead us to a coherent treatment of the relation between conceptualizations and meanings, as well as of categories and of their defining parameters on all levels of linguistic analysis, including the phonological.

1. Categories are constituted by interacting parameters of variation.
2. The reference or meeting point of such interaction is the prototype of the category, determined by the convergence of

the optimal values of the parameters with regard to a given function. Morphological categories represent the kernels of the prototypes.

3. Cognizance of the full variational range of all constitutive parameters is necessary for an adequate definition of a category. Defining by its prototype manifestations alone would not do.

4. Our work throughout is characterized by combining two approaches and respective results that should be neatly distinguished, although not separated, from one another:

a. The onomasiological approach. It consists in positing concepts and in defining them by a set of properties. They are not derived in any direct way from empirical observation. The move is abductive, i.e. by hypothesis and subsequent testing. These concepts are universal in the sense that they are applied in grammatical research to any language. They are the repraesentandum. Categories on all levels, grammatical, syntactic, semantic - even the notion of prototype itself - have such an aprioristic aspect.

b. The semasiological approach. It consists in assembling data within the framework of the posited categories; in ordering them into scalar parameters (continua), and, by way of inductive generalization, in arrriving at a common denominator of meaning. These meanings are not universal, they are language-specific. Their boundaries are fuzzy. They are the repraesentantia.

5. Function is the central notion that allows conceptualizations and common denominators of meaning to be brought together. It is the superordinated instance that commands prototypization. It can do this because of its Janus-like nature, combining the abductive and the inductive aspects. To merely posit a function would result in mere speculation. In a second move it must be subjected to test pertaining to inductive generalization, and, in this context the construction of parameter/continuum is a particularly powerful tool. The moves need to be in constant alternation, up and down, and, as Heraclitus would have it: "The upward and the downward path are one and the same. Removing one, you remove both."

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