

Iconicity in Grammaticalization Processes

Anna Giacalone Ramat
University of Pavia

1. Introduction

This paper is meant to be an attempt to investigate the relationships between the notions of Grammaticalization (= G) and Iconicity (= I). The general framework within which I set my remarks is an integration between historical linguistics with its specific concern with language change, and language acquisition research with its interest on developmental stages and strategies which learners apply when acquiring grammars.

I first discuss some points in the current definitions of iconicity and related concepts on which there has been some debate in the literature; subsequently I review data both of language change and second language acquisition in an attempt to substantiate the claim that similar paths of development which recur across all these types are the result of general forces acting on language acquisition and use. The evidence collected strongly suggests that different patterns of iconicity may interact with each other at different language levels. This state of affairs may manifest itself most clearly in the G process.

In current linguistic debate, and especially in typological linguistics, grammaticalization is taken as a process where something becomes or is made more grammatical (Lehmann 1982: 9). The process is viewed as structured in phases with gradual transition from autonomous lexical units to syntax and flexion. Essentially, the items which undergo G acquire a new status as grammatical forms or categories. To illustrate the G process I will cite two examples given by Lehmann. The first is the development of the Latin demonstrative pronoun *ille* to an anaphoric pronoun and also to an obligatory personal pronoun (*il* in French), marking the person of the verb. The second

example is the generally agreed derivation of the Indo-European verbal endings **m*, **s*, **t* for the three singular persons from the agglutination of personal pronouns.

The issue of G has been primarily studied in a diachronic perspective and in more recent research in a synchronic perspective as well (Heine, Claudi and Hünemeyer 1991), but it plays an important role also in language acquisition. In second language acquisition the transition from elementary learner varieties based on the pragmatic mode to more context-independent and elaborated varieties entails a gradual approach to the grammatical system of the target language. Thus the term *grammaticalization* is used in language acquisition research to refer to a continuous process of acquisition of pragmatic, semantic and syntactic constraints (Giacalone Ramat 1992, Skiba & Dittmar 1992).

This does not mean that G in the sense of typological linguistics is absent in acquisition: learner transitional creations may sometimes reveal attempts at building new grammatical forms or categories. If this is the case, such creations will most probably take place along the G channels that have been discovered by typologists (an overview of such channels can be found in Heine & Reh 1984).

As to Italian, a case in point is the use of adverbs or adverbial expressions like *sempre*, *basta*, *finito* to convey aspectual meaning, a trend which may develop for some learners into a real aspectual marker. The new insights that the perspective based on grammaticalization can offer for second language acquisition are discussed in Giacalone Ramat (1992), Skiba & Dittmar (1992).

The standpoint adopted here is to view the phenomena currently studied under the heading of G in terms of the role played by iconicity principles.

In dealing with grammaticalization and iconicity some preliminary questions need to be formulated:

- a. are G processes iconic in themselves or can cases be found where the G process may result in a decrease of iconicity? The latter position has been maintained, among others, by Heine, Claudi & Hünemeyer (1991: 121). Discussing the effects of the G process, the authors note that if a verb “go (to)” is employed for the expression of a tense category like the future, then this leads to a violation of the “one function-one form principle” in that one and the same linguistic form come to express two different meanings or grammatical functions.

- b. Since G is a directional movement from the lexicon to syntax to grammar should we expect to be confronted with different patterns of iconicity for the lexicon, syntax and morphology?¹ It has been maintained in a number of studies (Dressler *et al.* 1987, for example) that conflicts between subsystems of the language system arise because of the different orientation of the (naturalness) principles governing these subsystems. Indeed, we might expect to find that iconicity has to be restated when lexical or syntactic units undergo grammaticalization.

As a starting point I will recall that the idea that grammaticalization is characterized by a loss or weakening (*affaiblissement*) both of semantic meaning and phonetic form was formulated by Meillet (1912 = 1948), who was the first to introduce the term *grammaticalization* and to take into consideration some cases that later became stock examples for the process, such as the cycle of negation or the rise of periphrastic past forms in Romance and Germanic languages. Lehmann, too, (1988) states that “one of the most palpable symptoms of G is reduction on both the semantic and the phonological sides of the language sign. The logical endpoint of this is complete loss”. Restated in the terms of iconicity principles this should mean that when an autonomous word or a structure changes into a grammatical element, the iconic relation between form and meaning is weakened or lost because the phonetic substance may be reduced or assimilated to its environment and the meaning may change by expansion receiving a new grammatical function.

This is certainly true for a number of cases. I will try to argue, however, in favor of a different position, namely that it is not a question of loss, or decay, but rather that the G process gives rise to a shift in function, to the assignment of a new grammatical role to units previously belonging to the lexical or syntactic level. In that new function the linguistic units enter new configurations of iconicity. A process that might be called of “re-iconicization” along different parameters may take place.

This point has been raised also by Heine and associates (Heine & Reh 1984, Heine, Claudi & Hünemeyer 1991) who state that “recategorialization” may have the effect of restoring iconicity (1991: 215). In particular they discuss the case of locative constructions of the type *Peter is at home* which have been used to express progressive aspect (*Peter is at/in/on working* > *Peter is working*). In the transition from locative constructions to aspect marking most languages have eliminated some morphological material (for instance the adposition *at*) establishing a one-to-one correspondence between

form and meaning. The term “recategorialization” refers to cases similar to those discussed in this paper.

The line of research adopted here is concerned with the contribution that G studies can provide as regards improving our understanding of the transition from syntactic to morphological structures.

2. Iconicity vs. Transparency

Such terms as “iconic”, “diagrammatic” and “transparent” are often treated as synonyms in the literature on iconicity in language and are opposed respectively to uniconic, non diagrammatic, opaque.

As far as verbal signs are concerned, we can agree that language has a general iconic tendency whereby semantic sameness is reflected also by formal sameness (Anttila 1989: 89).

As to the relation of iconicity to isomorphism, Givón (1985: 188) assumes that “a reasonable sense of iconicity must presuppose the notion of isomorphism so that an iconic code is an isomorphically constructed code”. According to Haiman (1985) “isomorphism” refers to the correspondence of parts of the linguistic structure to parts of experience, while “motivation” refers to the correspondence of relations between parts. As noted by Croft (1990: 164), this is an unfortunate selection of terms, since motivation is too comprehensive a term including all kinds of motivation, such as economic motivation.

I will use the term *isomorphism* as referring to the one form-one meaning relation describing correspondences of elements and relations. While the one-form-one meaning principle has been applied to many kinds of domains, I am concerned here with a restricted range of phenomena involving relations between parts of the linguistic sign. Contrary to Givón, I will assume that isomorphism is a more specialized notion than iconicity and that it is clearly reflected in that kind of icons which are called diagrams. In this connection I draw on Peirce’s distinction between “icons” and “diagrams”, where icons exhibit a similarity or analogy between signans and signatum, while diagrams reflect the relationships among the parts (see also Dressler 1987: 17).² Diagrammaticity necessarily implies an isomorphic relation between form and function. To achieve a clearer understanding I will use the term of “structural isomorphism” to refer to diagrammatic relations of linguistic signs and will

assume that structural isomorphism has the property of transparency. Iconicity, on the contrary, denotes a relation of similarity and does not imply transparency. It is commonly used as a more general term to indicate some kind of relation between the sign and what it denotes, including the world experience. It can reproduce only some parts of the object, so that an iconic relation may not be isomorphic, as is the case of the phonic value of the [i] vowel to represent smallness (Kilani-Schoch 1988: 89).

Thus transparency and iconicity may in some cases run in different ways, more precisely whenever decrease of transparency in some respect preserves iconicity. Take for instance the future tense formation in Romance languages, which developed from a Latin modal construction:

cantare habeo > Ital. *canterò*

If we take transparency to be based on the isomorphism principle, we should admit that the Latin analytic, descriptive construction is more transparent than the Romance outcome, since the modal value is conveyed by a distinct lexical unit *habeo*. The Romance forms, however, preserve some kind of iconicity, represented in Italian by the stress pattern for the first and third person sing. This makes the ending recognizable as a label for future (the potential competition with the 3rd sing. of “remote past” not being a real problem), although various phonological processes may have blurred the morphotactic transparency: cfr. *cant-erò* instead of *cant-arò* with the expected vowel *a* of first conjugation verbs, or the irregular forms *rimarrò* < *rimanere*, *vedrò* < *vedere*, etc.

All this suggests that loss of semantic transparency and phonetic substance due to the G process may trigger a restoration of iconicity at the morphological level through changes that are always part of the grammaticalization process, such as for instance developing a morphologically marked future tense.

3. Evidence from Acquisition and from Pidgins and Creoles

The role of cognitive and communicative functions in language development has been investigated by psycholinguists within functionalist theories such as the “competition model” (MacWhinney & Bates 1989). Admittedly, several aspects of language acquisition, language use and language change may be

usefully analyzed in the framework of functional determination, but, as previously stated, iconicity relations between linguistic signs and world experience are beyond the scope of this paper. For the current purposes we will be concerned only with those phenomena which are most relevant for the G process, that is processes whereby semantic relations are coded as grammatical forms.

In the acquisition of morphology both for first and second language acquisition it has been repeatedly pointed out that speakers use regularization strategies and favor semantically and morphotactically transparent patterns. The general reason for this is that more transparent formations are easier to process (Dressler 1987: 109): this confirms that extralinguistic foundations of a psychological and cognitive nature impose constraints on some properties of linguistic structure.

There is a considerable body of evidence to support this widely accepted interpretation. I cite only Slobin (1985: 221), who states that children often reshape parental language material to make it more iconic. Recent research on Italian by Lo Duca (1991) concerning the acquisition of agentive nouns in Italian as a first language has shown a clear preference for more semantically and morphotactically transparent word formation rules: cfr. the preference for *aio* in children's "neologisms" (= creations) such as *negoziaio* "shopkeeper", *giardinaio* "gardener", etc.

There is also a considerable body of data on second language acquisition. Research in this area has been carried out under the "Pavia Project" (see Bernini & Giacalone Ramat 1990 and Berretta in this volume). To give just one example of a regularizing strategy, learners of Italian tend to avoid variation in verb stem and regularize past participles producing more transparent forms like *chidata* < *chiedere* instead of *chiesta* "asked".

I will treat the issue of conversion in some detail. This is not usually considered a case of G, but is in some sense relatable to it, because conversion concerns the emergence of a new class of grammatical forms with zero expression. Conversion is an interesting case in that it shows how complex the relations between iconicity and other parameters like naturalness and frequency are.

According to Dressler's naturalness scales, allowing for predictions on language use and language acquisition, conversion should be a totally uniconic process because the semantic operation of converting nouns into verbs or viceversa does not correspond to any formal modification (comp. *a cut*

from *to cut* etc.).³ We should thus predict that conversion is not favored among word formation rules (i.e., it is both rare and non productive in terms of token frequency), which seems to be the case for many languages, with some exceptions, however, since conversion rules are productive in English, as is well known.⁴

In theory, we would thus expect an opaque form/function relationship to be avoided in language acquisition. However, the interesting result of a research carried out by Pavesi (1994) on the acquisition of conversion in English by Italian learners was that seemingly uniconic forms too can be chosen in acquisition. Pavesi has found selective patterns according to which learners choose conversion rather than more transparent derivations by means of affixes. For instance, nouns are more likely than verbs to be formed by means of conversion and among verbs de-adjectival verbs are preferred to denominal ones.

According to Pavesi, these preferences can be accounted for on the basis of semantic parameters which ultimately reflect iconic strategies. One of these parameters is called “semantic proximity” by Pavesi: it is intended that the less the semantic modification between the base and the derivative is, the more likely the conversion is. Indeed *nomina actionis*, unlike for instance agentives, are semantically very close to verbs, their syntactic position and other dependency relations keeping them apart: compare *a fall* < *to fall* or *a cut* < *to cut*. It can be maintained that an iconic relation holds between the minimal semantic differentiation and the lack of morphological cues.⁵ Another parameter proposed by Pavesi has to do with the notion of prototypicality of nouns and verbs (Hopper & Thompson 1985): conversion is favoured when the bases and the derived forms are not prototypical members of their categories — e.g. verbs are not readily derived from nouns of concrete objects by means of conversion. The third parameter termed by Pavesi “predictability of the derivate” is in some sense also iconic. It applies to de-adjectival verbs. Here the meaning of “getting something to become (more) X”: *to clean* < *clean*, or “becoming (more) X”: *to yellow* < *yellow* (where X is an adjective) is well-established throughout the group of such verbs.

Dressler (1987: 21, note 8) observes that transparency has to be checked separately on the semantic and morphotactic level, although a tendency can be found towards some iconic relations between the two levels: for instance an opaque relation tends to be opaque both in morphosemantics and in morphotactics. Conversion has a low degree of transparency on both levels, however

it still retains a broader iconic relation. The gain in simplicity and economy of expression achieved by such pairs as *to cut/a cut* requires a counterpart in the semantic closeness, or low degree of distinctness.⁶ In conclusion, conversion can be shown to provide evidence that an iconic relation may not be isomorphic.

In order to capture a different perspective in G processes we may turn to pidgins. These have often been taken as languages with a high degree of transparency and analytic structure.⁷ This feature has been seen as a consequence of the reduced size of their vocabulary and the need to fill gaps in the lexicon by means of compounding and circumlocutions. Romaine (1988: 35) recalls how a number of meanings expressed by unrelated lexemes in English are all encoded in Tok Pisin by means of constructions incorporating the word *gras* ‘grass’: *gras bilong fes* means ‘beard’, *gras bilong hed* means ‘hair’, *gras bilong pisin* means ‘feather’. Romaine argues that we could say that *gras* has the same relationship to the ground or earth that feathers have to a bird or a beard to a face: they are all coverings on different surfaces. This is a clear case of diagrammatic iconic relation where the relationships of the signs to each other mirror the relationships of their referents (Haiman 1980: 515).

It is widely recognized that one major result of the process of creolization and pidgin expansion is that the language acquires a more complex grammatical structure, an inflectional and derivational morphology (to some degree, at least), a number of devices for marking syntactic relations, etc. The question I am particularly interested in here is to what extent the changes occurring in the transition from pidgins to expanded pidgins and creoles can be interpreted as the result of grammaticalization processes and iconicity principles. The mechanism of the expansion of pidgins as documented, for instance, in Tok Pisin and West African Pidgin provides interesting evidence of grammaticalization showing how autonomous words become grammatical markers. A case in point is *-pela* from English *fellow* in pidgins of the Pacific area which has developed to a classifier attached like an affix to various elements, particularly adjectives (Romaine 1988: 37; Holm 1989: 533). A second often quoted example of G is the English temporal expression *by and by* which developed in Tok Pisin to *baimbai* and through phonological reduction ended up as *bai and bə* prefixed to the verb as a marker for future (Sankoff & Laberge 1973, Romaine 1988: 58). Pidgins also offer instances of G in the area of tense, mood and aspect: here the most striking innovation is the development of an inventory of preverbal elements marking these semantic functions which has

its origin in a number of lexical items of the source language: *bin* < English *been* as “anterior” marker, *go* < English *go* as an “irrealis” marker.

When independent words become grammaticalized they may partially lose their semantic meaning. This holds true for the cases mentioned above. In such instances the processes leading from lexical to more grammatical structures may entail a recovery of iconicity at the morphological level. This happens whenever tense or aspectual distinctions are unequivocally expressed by grammatical markers.

In her discussion of the issue of iconicity in pidgins Romaine (1988: 39) states that “as part of the process of creolization a great many iconic features are lost” and cites the case of the generalized predicate marker *i* in Tok Pisin, deriving from the anaphoric subject pronoun *he*: *yupela i kam* “you(pl) came”. The pronoun has become cliticized to the verb to mark a purely grammatical form. It is by no means clear that a loss of semantic transparency with no compensation at a different level has taken place: we might argue that the form *i* has indeed lost its semantic transparency, no longer being analyzable as a 3rd person pronoun, but it has, however, gained a morphological diagraphmaticity having developed to an obligatory marker of the predicate and having thus entered a grammatical structure. This would be a case of re-iconicization (cfr. section 1) due to the assignment of a new grammatical value.

The view that pidgins are more iconic than creoles raises many questions also in connection with the feature of polyfunctionality, i.e. the presence of words which may function as nouns, verbs and adjectives, a feature that pidgins and creoles use to extend their lexicon (Sebba 1981, Mühlhäusler 1986). In fact this grammatical and semantic ambiguity violates the one form-one meaning principle and is *per se* an opaque feature, although one might argue that a language that has such a possibility gains in simplicity or economy (Romaine 1988: 38, Mühlhäusler 1986: 173). Speaking of gains captures, however, only one aspect of the problem. Pidgins are in some way too simple and have to rely heavily on pragmatic devices to make up for their lexical and grammatical deficiencies. Thus, we would expect that pidgins reduce their polyfunctionality when developing to expanded pidgins or creoles. This seems to be the case of Tok Pisin, which has developed some derivational morphology (Mühlhäusler 1986).

It is perhaps not so striking to find essentially the same pattern in learner varieties: lexical items that cannot be unequivocally assigned to word classes

are quite common in second language acquisition (Klein 1986: 81, Skiba and Dittmar 1992). Skiba & Dittmar have analyzed the polyfunctionality of forms like *bitte* and *muss* in early learner varieties of German. In later stages, as a result of a G process, these items change their word class, adapting to the rules of the target language. Elsewhere I have discussed forms like Italian *lavoro* and *studio* which can be interpreted as nouns or as verbs on the basis of context and syntactic collocation (Giacalone Ramat 1992). Moreover, in learner utterances, the first verbs carry lexical content, but do not code specific temporal relations. Such polyfunctionality seems a typical feature of very initial interlanguages, a stage before the learner develops the required morphological means for marking grammatical categories.⁸

If we keep in mind Bickerton's (1981) claim that we see language universals at work in child language acquisition and creolization, but not in pidginization, we are offered an explanation as to why iconicity is not strong in pidgins, or at least not pervasive. They are in fact in some ways rudimentary and restrictive languages like early interlanguages, with poor grammatical devices to express semantic categories: they are inadequate to deal with developing communicative requirements. The initial polyfunctionality is gradually restricted by means of grammaticalization, that is introducing new categories for which no grammatical expression existed before, or via analogical innovation (as proposed by Meillet 1912: 130).

Thus, it seems to me that evidence gained from language acquisition and pidgins highlights interesting perspectives both on grammaticalization and on iconicity studies.

4. Language Change and Analogy

Something about the role of iconicity in analogical changes may be mentioned in passing. Generally speaking, proportional analogy is of course diagrammatically iconic, an icon of relation (Anttila 1989: 89). The child or the learner who creates an Italian analogical form *dicete* for the "correct" *dite* "you say-2ND PL." completes the proportion *vede: vedete = dice: X*. The study of analogy as a general force striving towards regularity in morphological processes has a long history in linguistics. Textbooks on historical linguistics discuss many cases taken from different languages which document a tendency to extend the existing patterns (Anttila 1989, etc.): for example consider Old English strong verbs such as *helpan* pret. *healp* "to help", which have

shifted into the weak class, or the English plural *books* which substitutes the older form *beech*. Thus there seems to be little doubt as to the transparent result of analogical changes. It should be noted, however, that analogical changes do not form part of G processes as defined above, since they do not introduce elements into the grammar from elsewhere, but rather expand regular forms on the basis of existing models.⁹ Indeed the forms they substitute are already part of the grammatical structure, as in the cases mentioned above of changes in verb or noun paradigms in English.

For the purposes of this paper I will explore the question as to what extent G processes in historical linguistics move in the direction of a more diagrammatic relation between form and function.

As an illustration of G and its effects on transparency I will take the case of auxiliariation, the process through which some verbs come to be used with an auxiliary function to express typically tense, aspect and mood. Summarizing the results of a discussion on the historical development of auxiliaries in a number of different often unrelated languages, Ramat (1987) has proposed the following path for the origin of the Romance present perfect: (1) in a first stage, full verbs such as Latin *habere* had full lexical meaning; (2) these developed subsequently into a predicative construction in conjunction with a past participle (formerly denoting some properties of the object);¹⁰ (3) finally periphrastic forms arose where the autonomous lexical meaning is lost and only the marking of tense, aspect and mood is retained.

A further stage may be represented by the agglutination of the former auxiliary, as shown by the Romance future and conditional forms such as *mangerà* "he shall eat", *mangerebbe* "he would eat".

The case of Latin *habere* developing from a full verb to a perfect tense auxiliary and a future tense auxiliary in Romance languages is representative of similar, although clearly not identical, developments in the Germanic languages (see Behaghel 1924 for periphrastic perfect in German, Goossens 1987 for *shall* and *will* in English, etc). All these constructions have in common the fact of being periphrastic structures that replace simple forms, or in other words analytic forms which replace synthetic ones, a predominant, but not exclusive tendency in Romance and Germanic languages (Giacalone Ramat 1989).¹¹ Even if some developments are partly language specific,¹² nonetheless a tendency to a more transparent remodelling emerges clearly as a general tendency. In the periphrastic perfect the auxiliary carries the tense aspect and mood values and achieves a better isomorphism between form and function, in the new synthetic Romance forms for the future and the condition-

al, on the other hand, the morphological internal relationship between verb stem and affixes is attained is sufficiently clear and transparent.

A further step along the grammaticalization scale is represented by the contracted forms of auxiliary verbs such as English *I'll try, won't you*: in present day spoken English these forms have lost their status as free morphemes and behave like inflections (or more precisely intreflections, an infrequent type in Indo-European languages). Semantic and morphotactic transparency is not high in such forms. A clue to their non transparent status comes from the acquisition processes: in first as well as in second language acquisition it has been found that as a general learner strategy free morphemes are learned before bound morphemes. Bellugi (1967) established that the free form *will* was learned before the bound *'ll* by American children acquiring English as their first language, despite the fact that *'ll* was by far more frequent in the input the children received. The same holds true for English as a second language (Wode 1981).

As to the G mechanisms, it will be useful to note that in the transition from lexical to grammatical categories a number of correlated phonological, morphosyntactic, semantic and pragmatic changes are involved. Forms that undergo G tend to lose their lexical meaning and to broaden the range of contexts in which they are used. This process is called “desemanticization” and “expansion” by Heine & Reh (1984). As an illustration we take the development of the French negation *ne... pas* deriving from Late Latin constructions such as *non vado passum* “I don't go a step” and similar negative expressions in Italian *non voglio mica* lit. “I don't want a crumb”, etc. (Molinelli 1988, Ramat & Bernini 1990).

When in such constructions the noun *passum* or others similar, like *guttam* “drop”, *micam* “crumb” (originally lexical objects governed by the verb), were reanalyzed as negation markers, a G process was accomplished, whereby an optional element became an obligatory one. This change entailed a decrease in the semantic content of the items involved, which became manifest when *pas* could be used with semantically incompatible verbs like for instance *bibere* “to drink”: French *je ne bois pas*. On the other hand the rise of a discontinuous negation pattern *ne...pas* in French seems to be in conflict with the weakening tendencies of G. In Old French *pas* acts as a “postverbal emphasizer” (Schwegler 1990: 55) reinforcing the old negative element *ne*. When at a later date the construction evolved into a semantic unity (see Schwegler for details), then the more perceptible discontinuous negation

could be interpreted as an increase in iconicity. Grammaticalization and iconicity seem to reinforce each other in this stage of negation development. As a further step along the G path recall that in colloquial French loss of the first element *ne* may occur.¹³

The notion of “asymmetry between meaning and form” has been proposed by Heine, Claudi & Hünnemeyer (1991) as a recurrent result of G. This happens because conceptual shift precedes morphosyntactic and phonological shift. Indeed, there are many examples in many languages of morphemes or constructions that have acquired new grammatical functions even though they still retain the old morphosyntax. In Romance languages, for instance, concessive markers are derived from markers originally having other values (Harris 1988), as is the case of Italian *nonostante (che)* “notwithstanding, in spite of”, an old Latin ablative meaning “not opposing”, which developed into a prepositional construction (*nonostante il freddo* “in spite of cold”) and a concessive conjunction (Serianni 1989).

We are led to the conclusion that in a number of cases the result of grammaticalization contradicts the one-form-one meaning principle. As stated by Heine, Claudi & Hünnemeyer (1991: 260f) that polysemy is a natural outcome of G.

5. Exploring Parallel Developments: the Acquisition of Tense-Mood-Aspect morphology

Our diachronic glimpse on the development of auxiliaries in the Romance and Germanic languages has provided us with evidence on patterns of development for tense-aspect categories to achieve a formal expression. I will now explore the hypothesis that language change and language learning are constrained by the same set of restrictions, and that such restrictions are the result of some iconic principle of linguistic encoding, on the one hand, and of universal cognitive abilities, on the other.

In recent work on second language acquisition it has been shown how individual learners start using autonomous lexical elements and gradually step into the grammatical encoding of the target language. For ease of reference I will mainly refer to data collected within the “Pavia Project” on the acquisition of Italian as a second language (Bernini & Giacalone Ramat 1990).¹⁴ I have elsewhere claimed that the morphology of Italian has, generally speak-

ing, a higher degree of diagrammatic iconicity between form and function in comparison with French, English and also German and that these characteristics may explain the earlier emergence of a morphological “sensibility” in learners of Italian which is well attested in our data (Giacalone Ramat 1990 and 1992, Berretta this volume). Indeed, learners set out to organize the grammatical subsystems of the Italian language earlier than learners of the languages mentioned above.

According to this general acquisition strategy, a tendency has repeatedly been noted to express notional concepts such as temporal and modal distinctions first through free (lexical) morphemes and later through bound (grammatical) morphemes (Klein 1986, Bhardwaj, Dietrich & Noyau 1988, Dittmar & Terborg 1991, Stutterheim 1986). As far as Italian is concerned, this means that in very early varieties we will find pairs such as *prima* “before” ... *dopo* “after”, or adverbials like *ieri* “yesterday”, *l'anno scorso* “last year” to express past time reference, while the appropriate verb morphology is lacking and the verb appears mostly in a present-like unmarked form.

Auxiliaries take an intermediate position in the gradual acquisition of the grammatical devices of the target language. They are first omitted for a number of languages that use periphrastic past forms like Italian, English, Swedish (Bhardwaj, Dietrich & Noyau 1988, Giacalone Ramat 1993), but they precede the emergence of bound morphology for past tense (imperfect), future tense.¹⁵

For the issue of G some transitional structures are of particular interest which occasionally appear in different learners, although they do not belong to the target grammar. In the process of acquiring the Italian imperfect, a synthetic form with tense affix and endings for person and number: *ama-v-o*, etc., some learners build periphrastic forms by means of the imperfect of the auxiliary *essere* or *avere* + a “basic” verbal form (or an infinitive form): *non avevo credo* “I didn’t believe”, *era sempre mangiare* “he always ate” (Giacalone Ramat 1992). This analytic strategy reflects a universal diagrammatic tendency that can be found also in historical change. We may recall that in the historical development of verb systems in the Germanic and Romance languages a consistent move towards periphrastic forms has manifested itself. Periphrastic formations may meet a different fate in languages: they may remain as such, as is the case for the compound present perfect tense formations discussed above, or they are likely to step forward in the G processes and undergo fusion, as the Italian future *mangerò* shows, or they may be aban-

done in the course of acquisition, as the learners come closer to the target language. Although in different contexts, they presuppose a unified explanation: the better transparency of analytic forms vs. synthetic ones. For this reason they have replaced older synthetic constructions in historical development and they are sometimes created by learners, although the input they receive does not present that particular kind of analytic constructions. Finally, we may recall that in the competition between synthetic and analytic expressions preference is given to analytic forms according to one of the “operating principles” established for first language acquisition by Slobin (1985).

As for modality, according to Giacalone Ramat (1992), the first stage in acquisition is represented by modalized contexts where modality is not linguistically marked at all, but is retrievable from the context. In a later stage some modal verbs appear (*dovere* and *potere*, both first with deontic values) and some adverbs like *forse*, *probabilmente* or also *non so*, *io penso* for the epistemic modality (see also Dittmar & Terborg 1991 for a similar path in the acquisition of German). The morphological means to express modality such as future tense or conditional and subjunctive mood appear only in more advanced learners (Giacalone Ramat 1992).

Then for learners the expression of temporality and modality seems to follow a path of gradual grammaticalization from adverbials to modal verbs to tense and mood morphology. Moreover, deontic modality receives a grammatical encoding through modal verbs earlier than epistemic modality.

The later grammaticalization of epistemic modality through modal verbs and moods of course recalls patterns of semantic change that have occurred in the history of English modals (Goossens 1982, Traugott 1989).

All the observations made in the preceding sections point in the same direction: they suggest that a principle of diagrammatic iconicity whereby semantic units tend to be expressed by clearly recognizable lexical or grammatical morphemes is at work in different kinds of linguistic developments, in historical linguistics as well as in acquisition. The study of language acquisition shows (Slobin 1985) that iconicity principles continue to apply across generations of users.

The comparison between historical and acquisitional data does not imply that the processes of change observable in both instances necessarily correspond precisely in stages or details. For instance, there is no evidence that learners go through a stage of auxiliary postposition, while an order infinitive + auxiliary has to be presupposed in the historical evolution leading to Italian

manger-à “he will eat”, *manger-ebbe* “he would eat”. Diachrony and language development in individuals may show the same types of processes, but they do not necessarily coincide as to the actualization of change.

6. Some Concluding Remarks

With respect to the position that grammaticalization necessarily entails loss of semantic and phonological distinctions and consequently increases opacity, this paper has tried to introduce the notion of different levels of iconicity operating in the various language components. My view is that a modular and dynamic vision of the interaction among language components may offer an adequate explanatory tool to handle both diachronic change and acquisitional development.

Heine, Claudi & Hünnemeyer (1991: 120) ask the question as to whether grammaticalization theory relates to the principles of naturalness and conclude that in spite of several parallels they deal with “drastically different perspectives of linguistic behavior”. It would seem to me, however, that such parallels should be investigated more fully since the processes leading from a less grammatical to a more grammatical structure may be described in a number of instances as reflecting the effect of principles of naturalness and iconicity.

Since G process entails a change of linguistic level from the lexicon and syntax to grammar, we may reasonably expect a shift in the encoding of form-meaning relations. We might call it a “re-iconicization” according to specific techniques and properties of the language component in point. This is, in fact, what our data have shown us.

A principle of level specific iconicity may be assumed: it should be specified for the lexicon, syntax and morphology. Much recent research on iconicity, including other papers in this colloquium, has been confronted with this task (see also Haiman 1985, Dressler *et al.* 1987, Givón 1985 and many others). As stated previously, G is a phenomenon which crosses the boundaries of single constituents: shifting from the syntactic to the morphological level free morphemes may change to affixes. Affixation in its turn builds a new diagrammatic relation between the stem and the affix and causes the form to enter some diagrammaticity scales (Dressler 1987) which hold for the morphological component.

As always in linguistic change, we cannot predict whether a G process will take place, while the patterns along which it will develop once it has been initiated have, at least partially, been explored. I see the contribution that a perspective based on iconicity principles can make to grammaticalization studies in an improved understanding of such patterns. In the reverse direction G can also contribute to linguistic theories based on iconicity principles such as Natural Morphology. Indeed the transition from syntactic to morphological structures deserves more attention within a naturalness-iconicity theory: this aspect seems to be properly dealt with by the grammaticalization theory. The two approaches seem close to one another and the definition of possible overlapping and mutual boundaries represents a challenge for future research.

Notes

1. This is not to say that G cannot be reversed. As shown by Ramat (1992) and contrary to Lehmann, degrammaticalization processes do exist in languages and can take items from grammar back into the lexicon. An interesting issue that cannot be discussed at length here is to what extent iconicity is involved in degrammaticalization processes. I will only briefly note that degrammaticalization seems to result, at least in a number of cases, in loss of iconicity. In this connection it is worth mentioning as an example the case of the suffix *-ismo* discussed by Ramat. This suffix is used in Italian to derive nouns mostly from adjectives, such as *social-ismo*, *formal-ismo*, *efficient-ismo*. Drawing on the transparent relation of the derivational suffix to the base, a noun *ismo* has been extracted, meaning “abstract and possibly abstruse philosophical, political, sociological speculations”, sometimes with a slightly derogatory nuance: *tutti questi ismi...* The substantiated suffix is no more analyzable and functions as a symbol, a purely conventional connection between form and function.
2. Peirce distinguishes three classes of signs: symbols, indexes and icons. He views the term “icon” as superordinate and subdivided into three subclasses: images, diagrams and metaphors (Peirce 1965 [= Italian translation 1980: 140], Kilani Schoch 1988: 83 ff.).
3. Generally speaking, morphological operations are additive: there are, however, processes that run counter to the dominant pattern. I have elsewhere discussed a number of such cases under the notion of “dysfunctional changes” (Giacalone Ramat 1985), focussing on the so-called “subtractive” word formation rules and on zero-formations. Dressler (1987: 104) distinguishes between conversion and subtractive word formation rules, which is “a technique even more radical than conversion”. An example is Russian *logika* “logic” > *logik* “logician”. Here the addition of an intensional meaning in the signatum corresponds to the subtraction of phonological material in the signans, which is antiagrammatic. But these are very marginal cases. Recently Crocco Galèas (1990) has argued in favor of the naturalness of conversion as ‘morphological metaphor’ drawing on a “principle of economy of signantia” that is recognizable in several metaphorical processes.

4. In Italian, the status of forms like *martellare* “to hammer” from *martello* “hammer” may cast some doubts as to whether they really lack any formal modification. Indeed the thematic vowel in *martell-a-re* may be taken as a derivational suffix and thus as a clue that a recategorization as a verb has taken place (Scalise 1990). Hence denominal verbs would not belong to conversion. Thornton (1990), however, suggests that a zero-suffix associated with “an intrinsic thematic vowel” may be present in denominative verbs.
5. This is confirmed by the fact that in Pavese’s data conversion for locative and agentive nouns (as e.g. *judge* < *to judge* or *lift* < *to lift*) is avoided; indeed in such cases the semantic modification of the derived form is more relevant than for action nouns.
6. This claim goes in the same direction as Hopper & Thompson’s (1985: 150) assertion that “nouns” and “verbs” are iconic categories following the “Iconicity of lexical categories principle” according to which the more prototypical semantic and discursive characteristics they have (or the more representative of their categories they are), the more distinct from neighboring forms their linguistic form will be. Nouns derived from verbs by means of conversion are semantically minimally distinct from verbs and indeed lack any special morphology typical of nouns.
7. Haiman (1980 and 1985) tries to establish a broad distinction between “lexical” and “grammatical” languages, where of course pidgins, like learner varieties, should be more grammatical and their grammars more iconic (although we might wonder whether pidgins should be more grammatical than, say, English, since they have so little grammar at all!).
8. Polyfunctionality has to be kept apart from conversion (see above), because the notion of conversion makes sense only for languages which do use additive morphology processes for distinguishing word classes. What we are dealing with here are languages which have very few word formation rules.
9. We may recall that Meillet (1912 = 1948: 130) views analogy together with grammaticalization as the two major, but distinct, sources of new grammatical forms in language. As observed by Heine, Claudi and Hünemeyer (1991: 9), the distinction between analogy and grammaticalization is important to Meillet, but is of interest also to modern G studies.
10. For illustration I take an example from Pinkster (1987: 201):

nam et capillos nostros ipse utique creavit et numeratos habet
 “for he has certainly created our hairs and has them counted”
 (Augustinus, Serm. 62,10,15)
11. In Giacalone Ramat (1989) I have pointed out to some “resynthesizing” tendencies in Romance languages: clitic pronouns that behave like verbal affixes in French *je veux* “I want” etc., or particles that become semantically and morphologically part of the verb in Italian and behave like a flexion: *entrarci* “to have something to do with it”, *starci* “to agree with”. Cfr. *non c’entra* “it has nothing to do with it”, hence in low varieties of Italian *non può entrarci* “it can’t have anything to do with it” with agglutinated particle.
12. For instance in the case of Latin a concomitant phonological factor of change may reside in the fusion of /b/ and /v/ in Late Latin that caused the distinction between *laudabit* “he will praise” and *laudavit* “he praised” to disappear (Pinkster 1987: 210).

13. Meillet (1912 = 1940: 140) has discussed in more detail the “cycle” of negation starting from Indo-European *ne* (Sanskrit *na*, Lithuanian *ne*, Gothic *ne*, etc.). He speaks of a “force expressive” in language leading to reinforcing negation by means of other words, as is the case for Latin *non* < *noneum* “not one”, German *nicht* < *ne wiht* “not a thing” (see also Heine and Reh 1984, Lehmann 1982, Croft 1990). The cycle of negation has developed further after the stage represented by Standard French. In colloquial popular French *pas* is often the only marker for negation: *Je le vois pas* “I don’t see him” and in some French creoles like Mauritian creole */pa/* is preposed to the verb (Véronique 1990). As Meillet puts it, “les langues suivent ainsi une sorte de développement en spirale”.
14. Cf. Giacalone Ramat (1990, 1992) for details on the subjects examined and on the methodology of data gathering.
15. An acquisitional sequence for acquisition of temporal and modal relations and verbal morphology for Italian as a second language was established as a result of investigations on different subjects (Bernini & Giacalone Ramat 1990, Giacalone Ramat 1992, 1993). The following phases were observed: Present (Infinitive) > Past Participle (+Auxiliary) > Imperfect > Future > Conditional > Conjunctive. Between these phases an implicational relationship was observed: this means that no learner develops a future who has not yet developed an imperfect, or a conditional not having a future.

References

- Anttila, Raimo. 1989. *Historical and Comparative Linguistics*. 2nd ed. Amsterdam-Philadelphia: John Benjamins.
- Behaghel, Otto. 1924. *Deutsche Syntax*. Vol. II. Heidelberg: Carl Winter
- Bellugi, Ursula. 1967. “The Acquisition of Negation.” Doctoral Dissertation, Harvard University
- Bernini, Giuliano & Anna Giacalone Ramat. 1990. *La temporalità nell’acquisizione di lingue seconde*. Milano: F. Angeli
- Bhardwaj, Mangat, Rainer Dietrich, & Colette Noyau. 1988. *Temporality*. Strasbourg: European Science Foundation
- Bickerton, Derek. 1981. *The Roots of Language*. Ann Arbor, Michigan: Karoma Publishers
- Crocco Galéas, Grazia. 1990. “Conversion as morphological metaphor”. In J. Méndez Dosuna & C. Pensado. (eds.) *Naturalists at Krems*. 23-32. Salamanca: Ediciones Univ. de Salamanca.
- Croft, William. 1990. *Typology and Universals*. Cambridge: Cambridge University Press.
- Dressler, Wolfgang, Willy Mayerthaler, Oswald Panagl, & Wolfgang Wurzel. 1987. *Leitmotifs in Natural Morphology*. Amsterdam-Philadelphia: John Benjamins.
- Giacalone Ramat, Anna. 1985. “Are there dysfunctional changes?” In J. Fisiak (ed.). *Papers from the 6th ICHL*, 427-439. Amsterdam-Philadelphia: John Benjamins, 427-439
- Giacalone Ramat, Anna. 1989. “L’interazione di fattori esterni e di fattori interni nella predicibilità del mutamento linguistico”. In V. Orioles (ed.), *Modelli esplicativi della diacronia linguistica*, 167-184. Pisa: Giardini.

- Giacalone Ramat, Anna. 1990. "Presentazione del Progetto di Pavia sull'acquisizione di lingue seconde. Lo sviluppo di strutture temporali". In Bernini & Giacalone Ramat (eds.), 13-38
- Giacalone Ramat, Anna. 1992. "Grammaticalization processes in the area of temporal and modal relations". *Studies in Second Language Acquisition*, 14, 297-322.
- Giacalone Ramat, Anna. 1993. Sur quelques manifestations de la grammaticalisation dans l'acquisition de l'italien comme deuxième langue. *AILE (= Acquisition et interaction en langue étrangère)* 2, 173-200.
- Givón, T. 1984 & 1990. *Syntax. A functional-typological introduction*. Amsterdam-Philadelphia: John Benjamins. (Vol. I 1984, Vol. II 1990).
- Givón, T. 1985. "Iconicity, isomorphism, and non-arbitrary coding in syntax". In Haiman (ed.), 187-219.
- Goossens, Louis. 1982. "On the development of the modals and of the epistemic function in Old English". In A. Ahlqvist (ed.), *Papers from the 5th ICHL*, 74-84. Amsterdam-Philadelphia: John Benjamins.
- Goossens, Louis. 1987. "The auxiliarization of the English modals: A functional grammar view". In Harris & Ramat (eds.), 111-143.
- Haiman, John. 1980. "The iconicity in grammar". *Language* 56, 515-540
- Haiman, John (ed.). 1985b. *Iconicity in Syntax*. Amsterdam-Philadelphia: John Benjamins
- Harris, Martin & Paolo Ramat (eds.). 1987. *Historical Development of Auxiliaries*. Berlin: Mouton De Gruyter
- Harris, Martin. 1988. "Concessive clauses in English and Romance". In J. Haiman & S. A. Thompson. (eds.), *Clause Combining in Grammar and Discourse*, 71-99. Amsterdam-Philadelphia: John Benjamins.
- Heine, Bernd & Mechtild Reh. 1984. *Grammaticalization and Reanalysis in African Languages*. Hamburg: Buske
- Heine, Bernd, Ulrike Claudi, & Friederike Hünemeyer. 1991. *Grammaticalization. A conceptual framework*. Chicago-London: University of Chicago Press.
- Holm, John. 1989. *Pidgins and Creoles*. Vol. I: *Theory and structure*. Vol. II: 1990. *Reference survey*. Cambridge: Cambridge University Press.
- Hopper, Paul J. & Sandra A. Thompson. 1985. "The iconicity of the universal categories of 'noun' and 'verb'". In Haiman (ed.), 151-183.
- Kilani-Schoch, Marianne. 1988. *Introduction à la morphologie naturelle*. Berne: Peter Lang
- Klein, Wolfgang. 1986. *Second Language Acquisition*. Cambridge: Cambridge University Press.
- Lehmann, Christian. 1982. "Thoughts on Grammaticalization." *Arbeiten des Kölner Universalienprojekts*. 48.
- Lehmann, Christian. 1988. "Grammaticalization in Modern German". Paper presented for the symposium on grammaticalization. University of Oregon, Eugene, May 12-15, 1988.
- Lo Duca, Maria Giuseppa. 1990. *Creatività e regole. Studio sull'acquisizione della morfologia derivativa dell'italiano*. Bologna: Il Mulino.
- MacWhinney, Brian & Elisabeth Bates (eds.). 1989. *The Crosslinguistic Study of Sentence Processing*. Cambridge: Cambridge University Press.

- Meillet, Antoine. 1912 (= 1948). "L'évolution des formes grammaticales". In *Linguistique historique et linguistique générale*, 130-148. Paris: Champion.
- Molinelli, Piera. 1988. *Fenomeni della negazione dal latino all'italiano*. Firenze: La Nuova Italia
- Mühlhäusler, Peter. 1986. *Pidgin and Creole Linguistics*. Oxford: Blackwell.
- Pavesi, Maria, 1994. *Formazione di parole. La conversione in inglese L2*. Milano: F. Angeli.
- Peirce, Charles Sanders. 1965. *Collected Papers*. Eds. Ch. Hartshorne & P. Weiss. Cambridge, Mass.: Harvard University Press. (Italian translation: *Semiotica*. Eds M. Bonfantini, L. Grassi & R. Grazia. Torino: Einaudi, 1980)
- Pinkster, Harm. 1987. "The strategy and chronology of the development of future and perfect tense auxiliaries in Latin". In Harris & Ramat (eds.), 193-223.
- Ramat, Paolo. 1987. Introductory paper in Harris & Ramat (eds.), 3-19
- Ramat, Paolo, 1992. "Thoughts on degrammaticalization". *Linguistics* 30. 549-560.
- Ramat, Paolo & Giuliano Bernini, 1990. "Area influence versus typological drift in Western Europe: the case of negation". In J. Bechert, G. Bernini & C. Buridant (eds.). *Toward a Typology of European Languages*, 27-46. Berlin: Mouton-De Gruyter.
- Romaine, Suzanne. 1988. *Pidgin and Creole Languages*. London: Longman.
- Sankoff, Gillian & Suzanne Laberge. 1973(=1980). "On the acquisition of native speakers by a language". In G. Sankoff (ed.), *The Social Life of Language*, 195-209. Philadelphia: University of Pennsylvania Press.
- Scalise, Sergio. 1990. *Morfologia e lessico*. Bologna: Il Mulino.
- Schwegler, Armin. 1990. *Analyticity and Syntheticity. A diachronic perspective with special reference to Romance languages*. Berlin: Mouton De Gruyter.
- Sebba, Mark. 1981. "Derivational regularities in a Creole lexicon: the case of Sranan". *Linguistics* 19.101-117
- Serianni, Luca. 1989. *Grammatica italiana. Italiano comune e lingua letteraria*. Torino: UTET.
- Skiba, Romuald & Norbert Dittmar. 1992. "Pragmatic, semantic and syntactic constraints and grammaticalization: A longitudinal perspective". *Studies in Second Language Acquisition*, 14. 323-349.
- Slobin, Dan, 1985. *The Child as a Linguistic Icon-maker*. In Haiman (ed.), 221-248
- Stutterheim, Christiane von. 1986. *Temporalität in der Zweitsprache*. Berlin/New York: de Gruyter
- Thornton, Anna. 1990. "Vocali tematiche, suffissi zero e 'cani senza coda' nella morfologia dell'italiano contemporaneo". In M. Berretta, P. Molinelli & A. Valentini. (eds.), *Parallela 4. Morfologia*, 43-52. Tübingen: Narr.
- Traugott, Elisabeth. 1989. "On the Rise of Epistemic Meanings in English: An example of subjectification in semantic change." *Language* 65. 31-55.
- Véronique, Daniel. 1990. "L'apprentissage du français par des travailleurs arabophones et la genèse des créoles 'français'". *Langage et société* 50-51. 9-37
- Wode, Henning. 1981. *Learning a Second Language. An integrated view of language acquisition*. Tübingen: Gunter Narr.

Iconicity between Indicativity and Predicativity

Hansjakob Seiler
University of Cologne

1. Introduction

Iconicity is understood here as a relation between conceptual-cognitive content and the linguistic sign(s) representing such content. It is a relation of proportional similarity: The constituents of content relate to one another as do the constituents of linguistic representation. We are dealing in principle with diagrammatic iconicity; there is no clearcut boundary anyway between diagrammatic iconicity and images.

To repeat: Iconicity is conceived as the relation between content and the linguistic sign in its **entirety**; i.e. *signifiant* plus *signifié*. There exists the other relation between *signifiant* and *signifié* **within** the linguistic sign. For this we should reserve the term of *isomorphism*. It covers such aspects as transparency, analyzability, one-form-one-meaning correspondence and the like. There is gradience between complete isomorphism and its complete lack. On the other hand, iconicity alternates or cooccurs with the indexical-indicative and the symbolic-predicative modes of representation.

In this paper I want to consider iconicity not as an isolated phenomenon but as a mode of linguistic representation that is in constant interaction with the two other modes just mentioned. The obvious background for this is C.S. Peirce's triad of index, icon, and rule-determined symbol.

It seems to be commonly agreed that language in its manifestations is never completely iconic, nor completely indexical, nor completely symbolic. But we are still in need of a better insight into the interplay of these three

modes. I shall use numeration as a domain of inquiry for reasons that will hopefully become clear in the course of presentation.

The UNITYP framework of dimensions will be applied here, as it is being developed by my coworkers and myself.

A dimension is a continuous ordering of formally and semantically distinct structures that are iso-functional under a common cognitive-conceptual denominator. Dimensions studied thus far include POSSESSION, DETERMINATION, PARTICIPATION, and others. Each dimension is structured by two negatively correlated functional principles, called indicativity and predicativity, respectively. Indicativity means that the conceptual-cognitive content is more or less taken for granted and simply pointed out. Predicativity means that the content is progressively unfolded and explicated by rule-governed linguistic machinery. A third principle, iconicity, intervenes potentially everywhere in the dimension, but has its preferred *locus* at a turning point where the two other principles are about equal in force and neutralize each other. The turning point is often a point of multiple change and multiple choice situation in synchrony, and a point of instability in diachrony.

2. Iconicity between Indicativity and Predicativity in Numeration

2.1 Cognitive-Conceptual Structure

The idea that numeration would represent a universal linguistic dimension may derive some plausibility from the fact that the underlying cognitive-conceptual operation, viz. the act of counting, is of a dimensional nature. It involves a starting point, and a recursive operation of adding 1. These arithmetical operations presuppose an understanding of something conceptually deeper.

The following is an attempt at reconstructing the conceptual-cognitive content of numeration in terms of a stepwise constructional process. I shall enumerate three features, where one constitutes the starting point, and each subsequent feature follows from the preceding one.

The starting point would be a unifying functional *frame*, something like the human body with its manifestations of life, e.g. motion. The functional frame entails the *entities* fulfilling such a function, like the extremities, fingers, hands, limbs, etc. Assuming that they are equal with regard to a

common functional goal, this necessitates an order so they can be distinguished: This leads to *serialization*. The conceptual-cognitive content of number can thus be explicated in terms of an ordered sequence of three operational features leading to its construction.

There are three fundamental strategies, three TECHNIQUES in UNITYP terminology, by which these features are put to use in numeration: ATOMS, BASES, and CALCULUS. Not necessarily all features are constitutive for the definition of one TECHNIQUE, some may be concomitant. The configuration of features may be tabulated as follows, where vertical stroke means “constitutive”, and circle means “concomitant”:

	ATOMS	BASES	CALCULUS
1. functional frame			0
2. entities			
3. serialization	0		

The tabulation says that all three features are constitutive for the definition of the TECHNIQUE called BASES, whereas features 1. and 2. are constitutive for ATOMS, 2. and 3. for CALCULUS, and feature 2. (entities) is constitutive throughout. This would mean that BASES are in the literal sense the base of the entire process of numeration, and that both ATOMS and CALCULUS have their foundations in BASES. ATOMS are characterized by features that become manifest by being pointed out, like functional frame and entities. CALCULUS is characterized by features that become manifest by being defined, like “order/serialization”.

This outline of the content structure of numeration may suffice for our present purpose. It will serve as a framework for demonstrating how in linguistic encodings indexical vs. iconic vs. rule-governed (or, according to Peircean terminology: symbolic) representational strategies alternate or cooccur.

2.2 Encoding Strategies

From our reconstruction of the conceptual-cognitive operations of numeration we might expect that ATOMS are represented by indexical-indicative strategies, CALCULUS by definitory-predicative strategies, and that the representation of

BASES is predominantly iconic. However, things are not as simple as that. What we find in the data are overlaps and superpositions. We may describe this by saying that the three features posited on the cognitive-conceptual level are parameters of variation on the level of linguistic representation. Overlaps would then be overextensions of some parameter(s) beyond what can be naturally expected. With this in mind let us now inspect the linguistic reflexes of each TECHNIQUE.

2.2.1 *Atoms*

These are essentially the low numerals. They are predominantly indicative-indexical, which means that their representation is basically by pointing. In many societies we can still observe that they are never used without accompanying gestures, where the gestures function as the index, and the low numerals are indexical by metonymy. The obvious functional frame here is the human body with its parts, foremost the fingers of each hand, but also other parts. It is by virtue of this fixed frame of reference with its unifying functional properties — manifestations of life — and by pointing out the respective entities that a direct assignment of numerical value becomes possible. There is no need for, and only sporadic use of, calculatory operations, and serialization is irregular. In Montagnais (= Chippewyan, Athapascan) 7 is expressed as either (10-3) or (8-1), although 9 is (10-1) and 8 is (4 x 2).¹

In a situation where gestures pointing out fingers and other parts of the body are essential in counting, the formal distinctiveness of the corresponding numerals is of minor importance. The extreme case, viz. complete identity, is cited by Greenberg (op. cit.: 257 after Koch-Grünberg) for the language of the Kalia Indians in South America, where counting goes *meyakan* 1, *meyakan* 2, *meyakan* 3, with accompanying gestures involving fingers; *meyakan* probably means ‘denumerable entity’. A less extreme case is shown by languages where in finger counting the same numerical expressions are used for such pairs as 1 and 6, 2 and 7, 3 and 8, etc. These overlaps facilitated by the symmetrical shape of the hands seem to be quite wide-spread. The same tendency of weak formal distinctiveness of low numerals is shown by partial mutual assimilation of adjacent numerals, as in Russian 7 *sem*’, 8 *vósem*’, and 9 *dévjat*’, 10 *désjat*’. But there is also an iconic aspect involved here, adjacency being signalled by partial assimilation. We are presented with an “iconic index” (cf. Embleton, this volume).

A direct consequence of the indicative-deictic character of atoms is their close relationship to referential functions. In many languages, as, e.g., in French, the numeral for 1 *un* functions also as an article. In Ancient Indo-European languages the ordinal series began with two determiners, as in Latin *unus* '1st', *alter* or *alius* 'other, second', and only with *tertius* '3rd' are we in the numeral series proper. Another association of low numerals with the referential system of a language is shown by their sensitivity to gender distinction. This notoriously occurs with numerals 1, 2, 3, with an eventual tapering off of the number of gender distinctions. As I have shown elsewhere (Seiler 1986: 113 ff.) the basic function of gender and number agreement is to indicate constancy of reference.

We conclude this section by saying that atoms are essentially connected with the human body and its functions constituting the frame of reference, with gestures, pointing, referentiality, and direct assignment of numerical value.

2.2.2 Bases

Bases in numeration are packs of numerals. In English we have packs of tens, hundreds, etc.; in French we have packs of tens, hundreds, etc., and certain packs of twenties. In Efik and other Kwa languages we have packs of fives, twenties, and hundreds (Welmers 1973: 298).

What are the strategies for marking a base? They are not normally of a pointing or indicative character. Nor are they predicative in the sense of forming part of a rule-governed calculus. The strategy is predominantly based on the third option, the iconic. Iconic representation is determined by relational similarities between properties of the conceptual-cognitive *repraesentandum* and properties of the linguistic representation. The most natural simile for a base in the sense of a pack of denumerable entities is the human body with its parts. Consider Api (Micronesian) (Dantzig 1940: 25):

(1)	1	tai	6	otai 'new one'
	2	lua	7	olua 'new two'
	3	tolu	8	otolu 'new three'
	4	vari	9	ovari 'new four'
	5	luna 'hand'	10	lua luna 'two hands'

In many languages all over the world 'hand' is the obvious representation for a pack of 5: what the hand is to its fingers is the pack to its numerals, is the

BASE to its ATOMS. In some languages 20 is expressed by a phrase referring to something like ‘the whole person’ (i.e. fingers and toes). Compare Classical Aztec (Andrews 1975: 186) $20 = \textit{cempōhualli}$ ‘they are one twenty in number’ (referring to one person), and, with a different simile, $20^2 = 400 = \textit{centzontli}$ ‘it is one set of feather barbs’, in a vigesimal system. J. Greenberg (op. cit.: 272) reports the words for ‘road’ with value 100, ‘road large’ with value 1000, and ‘road large old’ with value 1’000’000 in Yuchi (Macro-Siouan). The similarity, here, seems to consist in spatial extension.

An important consequence of the iconic origin of base representations is their often approximative numerical value assignment. Who has ever established the exact number of entities in a feather barb? Then, an exact numerical value is fixed by conventional rule, and this is, of course, not iconic. This is shown, e.g., in Malay and other Polynesian languages, where *bulu* means ‘body hair, bird’s feathers’, and the apparently related or identical *pulu* by way of designating a multitude is secondarily and conventionally fixed to express the number 10 (Du Pasquier 1921: 116).

As there are usually more than one criteria for two comparables to be judged similar to one another, so iconic representation is bound to be approximative and often polyvalent. Base representations can be reinterpreted with different value assignments. One of the better known cases is the Germanic use of ‘hundred’ with the value of 120. It is the so-called *Grosshundert* ‘duodecimal or long hundred’. In Old Icelandic *tíroett hundrað* ‘ten-reckoned hundred’ is distinguished from the *tolfróett hundrað* ‘twelve-reckoned hundred’ (Sommer 1951: 65 ff.). The source for the reinterpretation seems to be located around the North Atlantic and Baltic Sea, and the primary functional frame seems to have to do with trading fish and other goods that come by the ‘Grosshundert’, where the remaining 20 represent a margin for discount.

Another, even more intriguing case is the value of Danish *tyve*. Danish exhibits a partially vigesimal system, its base being *tyve* with the value of 20. But in *fyrretyve* = 40 *tyve* has the value of 10 (4 x 10), and likewise in the less transparent *tredive* = 30 (3 x 10). Only with the archaic $50 = \textit{halv-tred-sinds-tyve}$, literally ‘half the-third-times-twenty’, i.e. ‘two and a half times twenty’ *tyve* assumes again its etymologically justified value of 20 which persists from 50 to 90. Much of the baffling character of this system disappears when we realize that base representations, by virtue of being the preferred *locus* for iconicity, are “entitled” to plurivalence.

If base marking is frequently iconic in origin, it nevertheless often happens that this origin becomes obliterated. After all, bases in numeration are used to work on, mostly in their capacity as serialized multiplicands. This means that they are recursively used thereby undergoing truncation and other modifications. Cahuilla (Uto-Aztecan) shows the following situation (Seiler 1979: 330):

(2)	1	súp̄te	6	kʷansúp̄te
	2	wíh	7	kʷanwíh
	3	páh	8	kʷanpáh
	4	wíčiw	9	kʷanwíčiw
	5	namakʷánaŋ	10	namečúmi
			11	namečúmi peta súp̄te

The system is quinary. Numerals from 6 to 9 are formed on the basis of 5 by additive juxtaposition of the digits: $(5 + 1) = 6$, $(5 + 2) = 7$, etc.; likewise for $16 = (10 + (5 + 1))$, etc. *Namakʷánaŋ* = 5 contains the lexeme *kʷánaŋ* ‘half’ and, as first element, the possessed form for ‘hand’, thus: ‘my hand(s) - half’ (i.e. ‘half of the fingers of my hands’). This would correspond to the iconic uses for ‘hand’ shown in ex. (1). But the Cahuilla expression has undergone changes: ‘my hand’ is *né-ma*, but the first element in 5 is definitely *nama-*. Furthermore, there has been truncation of *namakʷánaŋ* 5 to *kʷán-* in the expressions from 6 to 9. *namečúmi* = 10 is a base. It contains the lexeme *čúmi* ‘finish’ plus, apparently, ‘my hand’ as first element, thus: ‘(the number of fingers of) my hands-finished’. Again, *né-ma* ‘my hand’ is changed, this time to *name-*. After 10 numeration follows a different rule, using the superessive link *p-eta* ‘on top of it’.

2.2.3 Calculatory Operations

Syntactic and semantic rules implement the operations of addition, multiplication, subtraction, etc. To the extent that the formations are transparent, the relation to the *repraesentandum* could be said to be iconic. Note, however, that the native speaker is quite often unaware of this. Take French *quatre-vingt(s)* = 80 = ‘four (times) twenty’: French speakers assure us that for them it is not ‘4 x 20’. The relation *signifiant/signifié* is thus not isomorphic, or only weakly so. This holds more generally for etymologically transparent formations even outside numeration, e.g. the much belabored relation between *pomm-ier* ‘apple tree’ and *pomme* ‘apple’. As A. Meillet once stated, “pour le

français, il n’y a rien de commun entre le pommier et la pomme.” Note furthermore that in serialization the *vingt* in *quatre-vingt(s)* behaves differently from *vingt* = 20. Compare:

(3)	20	vingt	60	soixante	70	soixante-dix
	21	vingt et un	61	soixante et un	71	soixante et onze
	22	vingt-deux	62	soixante-deux	72	soixante-douze
	80	quatre-vingt(s)	90	quatre-vingt-dix		
	81	quatre-vingt-un	91	quatre-vingt-onze		
	82	quatre-vingt-deux	92	quatre-vingt-douze		

Incidentally, 20 *vingt*, 21 *vingt et un*, 22 *vingt-deux*, 23 *vingt-trois*, etc. is an example of an irregularity in the immediate neighbourhood of 20, a base of a cycle (see immediately below). To sum up, there is a subliminally iconic aspect to serialized numerals; but essentially they are formed by rules, i.e. by convention.

Now, we note interesting rule changes, and they notoriously occur in the neighbourhood of (iconic) bases: The switch from progressive to regressive counting in the last two digits before 20, as in Latin 18 = *duo-de-viginti* ‘two from twenty’, 19 = *un-de-viginti* ‘one from twenty’, is quite widespread. African languages like Yoruba (Welmers 1973: 301) exhibit intricate fluctuations between addition and subtraction, always in the neighbourhood of bases.

Another type of regressivity is “anticipatory counting” (Stampe 1970: 602), as exemplified by Danish in the above: The reference point is the upper-limit base, as with subtraction, but in contradistinction to the latter, serialization is progressive.

Altogether, we find turbulences between two series of consistent serialization in a transition zone immediately before and after a base. With base 10 many languages show a special rule for 11 and 12, before, with 13, serialization goes on along a more persistent rule:

In the Germanic languages the respective numerals are: Gothic *ain-lif* 11, *twa-lif* 12, German *elf*, *zwölf*, and their etymologies point to compounds with digits for 1 and 2 and a root **likw-* ‘to be left over’, thus literally ‘one-left over’, ‘two-left over’, with the elliptic base 10 to be supplied. After that, serialization continues as in German *dreizehn* 13, *vierzehn* 14, etc.

Basque (Araujo 1975: 141) exhibits 10 *hamañ* as a base, and from 11 to 19 compounds with 10 plus digits. From 13 onwards the comparison with the digits is straightforward, for 11 and 12 it is irregular:

(4)	1	bat	11	hameke
	2	biga	12	hamabi
	3	hiru	13	hamahiru
	4	lauĩ	14	hamalauĩ

and so forth through 18. But compare

9 bederaci with 19 hemereci

19 is irregular in the vicinity of 20 which constitutes another base; the system is vigesimal. In this latter case the numeral immediately preceding the base is affected.

A further peculiarity characteristic for the numerals surrounding a base is the situation of a multiple choice between variants. A clear example is shown by the last three decades approaching base 100 in French and its dialectal variants:

(5)	French	Belgian	Swiss
	70	soixante-dix	septante
	80	quatre-vingt(s)	septante
	90	quatre-vingt-dix	octante/huitante
		nonante	nonante

Note that 70 *soixante-dix* is a mixture between decimal and vigesimal. In pure vigesimal terms we would expect *trois-vingt-dix*. Furthermore, the behavior of the intervening digits agrees with the behavior of the earlier decades and is markedly different from the behavior in the eighth and ninth decade (compare (3) above).

The reason for all these turbulences and multiple choice situations seems to lie in the particular semiotic status of the base as the turning point between serializations and as the preferred *locus* for iconic representation, i.e. originating from criteria of similarity, and not deriving either from deixis or from rule-governed convention.

3. Conclusion

The relation between *signifiant* and *signifié* might well be said to be isomorphic **in tendency**, and the term “meaning” pertains to this relation. The Old Icelandic *hundrað* was used either with the meaning ‘100’ or with the meaning

'120', according to the situation, and not with both at the same time; and, as our example in 2.2.2. shows, it could be further specified, if the necessity arose. But from the conceptual-cognitive point of view, the sign *hundrað* (*signifiant* plus *signifié*) has function in the representation of a BASE; as such it is notoriously polyvalent and known for approximative or fluctuating interpretation.

The relation between conceptual-cognitive content and the linguistic sign(s) representing it is not at all isomorphic. This kind of representation has three major options: The indexical mode, the iconic mode, and the conventional, rule-governed mode. Each mode has its natural domain of application in the representation of numeration. In our reconstruction of the conceptual-cognitive process of numeration we concluded that BASES are the fundamental TECHNIQUE. This is reflected in the data, where bases determine and regulate both the flow of serialization - progressive or regressive - and the recursive use of atoms. And BASES are the preferred *locus* for iconic representation. But this does not mean that the iconic mode is more "natural" than the others two.

When we observed a certain degree of iconicity in such cases as French *dix-neuf* or *quatre-vingt(s)* or Gothic *ain-lif*, *twa-lif*, we tacitly disregarded the boundaries between synchrony and diachrony. This is only legitimate from the point of view of a cognitive-conceptual *tertium comparationis*. Synchronically these items are no longer analyzable. Adopting the cognitive-conceptual point of view opens new vistas on iconicity. Instead of a categorial notion defining a class of signs it emerges as an eminently processual mode of representation. Both synchronically and diachronically it is in constant interaction with the other two modes. Its degree of naturalness can only be gauged when all three modes are examined closely together.

Note

1. The information is from J. Greenberg's pioneering article on numeral systems (Greenberg 1978: 260), to which I am greatly indebted.

References

- Andrews, Richard J. 1975. *Introduction to Classical Nahuatl*. Austin & London: University of Texas Press.

- Araujo, Frank P. 1975. "Counting sheep in Basque". *Anthropological Linguistics* 17(4). 139-145.
- Dantzig, T. 1940. *Number: The Language of Science*. London: George Allen & Unwin.
- Du Pasquier, Louis-Gustave. 1921. *Le développement de la notion de nombre*. Mémoires de l'Université de Neuchâtel, Tome 3. Paris-Neuchâtel: Attinger Frères.
- Greenberg, Joseph H. 1978. "Generalizations about numeral systems". In J. Greenberg *et al* (eds.), *Universals of Human Language*, Vol. 3, 250-295. Stanford: Stanford University Press.
- Seiler, Hansjakob. 1986. *Apprehension. Language, object, and order. Part III: The universal dimension of apprehension.* (= *Language Universals Series*, Vol. 1/III.) Tübingen: Gunter Narr.
- Sommer, Ferdinand. 1951. "Zum Zahlwort." *Sitzungsberichte der Bayerischen Akademie der Wissenschaften, Philosophisch-Historische Klasse*. 1950, Heft 7. Munich: Akademie.
- Stampe, David. 1976. "Cardinal number systems." *Chicago Linguistic Society* 12. 594-609.
- Welmers, Wm. E. 1973. *African Language Structures*. Berkeley & Los Angeles: University of California Press.