

Stéphane Robert
Centre National de la Recherche Scientifique - LLACAN
robert@vjf.cnrs.fr

The challenge of polygrammaticalization for linguistic theory: fractal grammar and transcategorial functioning

Abstract

Transcategorial morphemes share the common ability to be used synchronically across different syntactic categories (synchronic grammaticalization). This paper first shows that transcategoriality is a general property of linguistic systems, variously exploited by languages, then addresses the theoretical questions raised by these morphemes. A new model accounting for this transcategorial functioning, named “fractal grammar”, is proposed and illustrated by various examples. The analysis for this particular functioning relates the polysemy of these morphemes to their syntactic flexibility in a dynamic way: the variation of the syntactic scope of the morpheme (“fractal functioning”) is triggered by its environment and produces its polysemy (variation of the semantic scope). Fractal grammar is thus defined by two basic mechanisms: the construal of a common image-schema (“scale invariance”), accounting for the unity of the morpheme, and the activation of “scale (or level) properties”, accounting for the semantic and syntactic variations. A typological sketch of transcategoriality is then sketched, in relation to the strategies used by linguistic systems for the distribution of grammatical information. Three types of transcategorial strategies are distinguished: “oriented”, “generic”, and “functional” transcategoriality. The status of linguistic categories is then discussed in the light of the analysis of these particular morphemes.

1. Introduction

1.1. From grammaticalization to transcategoriality

During the past twenty years, the revival of the study of grammaticalization has raised a number of important issues on the pathways and constraints of language change. Notably, the most common approach to grammaticalization was mainly based on Indo-European languages and adopted a historical perspective, focusing on the processes whereby items become more grammatical through time. These two characteristics are probably connected since, for structural reasons (*i.e.* because they are inflectional languages), in Indo-European languages grammaticalization is mainly (though not absolutely) an oriented and

diachronic process requiring a morphological erosion of the grammaticalized item.

However, as mentioned by several authors (Traugott & Hopper 1993: 17, Heine *et alii* 1991, Heine & Kilian-Hatz 1994), African languages provide some challenging cases for the standard linguistic theories, because they show striking cases of what one may call “synchronic grammaticalization”: the same linguistic unit is used synchronically in different syntactic categories. For instance, *bé* in Ewe, functions both as a verb ‘to say’ and as a complementizer (Lord: 1976); *ginnaaw* in Wolof can be used synchronically as a noun (‘the back’), as a preposition (‘behind’ or ‘except’) or as a subordinating conjunction with the meaning of (causal) ‘since’ (Robert: 1997). As shown by Heine & Kilian-Hatz (1994), there can be extraordinary semantic and morphosyntactic variation of some items, such as the morpheme *te* in Baka, which may behave like a preposition, an auxiliary, or a coordinating or subordinating conjunction, and which is at the same time associated with a number of different semantic domains and grammatical functions, such as case marking, subordination, diathesis, predication, derivation, tense-aspect, and modality (*cf.* 1.2.).

These cases of synchronic grammaticalization or “polygrammaticalization” (Craig 1991) are far from being restricted to African languages and actually are widespread cross linguistically: Ewe *bé*, for instance, has correspondents in many languages from different families (Güldemann & Von Roncador 2002). These morphemes reveal a property of linguistic systems which is variously exploited by languages: a variable proportion of morphemes in a language is used synchronically in different syntactic categories. Since these morphemes function synchronically in various syntactic categories (be they both lexical and grammatical or only grammatical), I would rather speak of “transcategorial morphemes” and transcategorial functioning, in order to distinguish the diachronic process of category change, classically designated by the term “grammaticalization”, and the syntactic and semantic flexibility shown in synchrony by these transcategorial morphemes. In the case where the transcategorial functioning is common and recurring in a language, the category change cannot be considered a marginal phenomenon or a transitory phase or stage of grammaticalization; it is rather a typologically important feature of the linguistic system. Actually, synchronic and diachronic grammaticalization are not separate phenomena. In this view, grammaticalization is the diachronic aspect of the more general phenomenon of transcategoriality that we have to account for¹.

¹ Echoing L. Michaelis’s discussion on the subject (1996: 180), I make no

1.2. The challenge

In some cases, the semantic and morphosyntactic variation of the item is not restricted to the shift from a lexical to a grammatical use but can cross many grammatical categories, as illustrated by the morpheme *tε* in Baka. As shown in Figure 1, extracted and adapted from Heine and Kilian-Hatz (1994)², the various uses of this morpheme are organized in a complex network of semantic and syntactic values: *tε* may behave like a particle, a preposition, an auxiliary, or a co-ordinating or subordinating conjunction³, involving various semantic domains such as space, time, aspect, cause, purpose, manner, instrument, case marking and more.

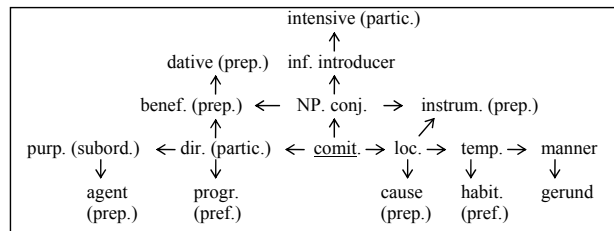


Figure 1: The uses of *tε* (Baka), from Heine & Kilian-Hatz 1994

The analysis of transcategorial functioning, of which *tε* is an especially clear case, raises some important theoretical questions. First of all, how can we account for the semantic and syntactic variation while maintaining the unity of the morpheme? The existing models⁴ dealing with polysemy are either only semantic or conceptual, such as those based on semantic networks and family resemblance (Lakoff 1987, Langacker 1987, Taylor 1989); or they essentially describe the evolution of syntactic patterns, as does the model of “grammaticalization chains” (Craig 1991, Heine *et alii* 1991, Heine 1992). They do not explicitly relate semantic and syntactic variation. Correlatively, what is the status of the linguistic

presuppositions about the fact that the various synchronic uses of a transcategorial morpheme necessarily reflect or can be equated with the path of historical development which yielded the latter.

² Table 25 in the cited article presents a semantic network, where the grammatical categories are not specified; when possible, I have inferred the grammatical categories from the related examples in order to add them in this partial figure. Possible mistakes are mine.

³ The different uses of *tε* are only grammatical and don’t include a lexical functioning, I call that subtype of transcategorial morpheme, a polyfunctional.

⁴ For an overview of the different models, see Heine *et alii* (1991: 108 sqq).

categories when the linguistic units show such syntactic flexibility? Are these “transcategorial” morphemes instances of fuzzy categories? All languages present cases of transcategorial functioning but the extent and modalities of transcategorial functioning are different across languages. In English, for instance, participles (such as *considering*) can be used as prepositions, inflected verb forms as subordinating conjunctions (*suppose, imagine...*), or temporal adverbs as discourse particles (*now, still*), but there is nothing comparable to the Baka *tε*. Some languages make extensive use of this capacity of the linguistic systems, while in others, the transcategorial functioning seems to be more limited and to follow different patterns. However, as pointed out by Anward (2000), part-of-speech recycling might be a much more common situation than usually thought. So finally, can we draw a typological sketch of transcategoriality and explain its various modalities in relation to different linguistic systems?

In this paper⁵, besides pointing to transcategoriality as a common and important feature of linguistic systems, I want to make a few proposals concerning the way we can account for this striking but well regulated variation of the linguistic units. First, I propose a dynamic model for the analysis of transcategorial functioning; then, I present a typological sketch of transcategoriality, and finally, I conclude with a few thoughts on the status of linguistic categories.

2. A dynamic model: fractal grammar

2.1. Why are transcategorial morphemes fractal?

Transcategorial morphemes share the common ability to be used synchronically in different syntactic categories. The proposed analysis for this particular functioning relates the polysemy of these morphemes to their syntactic flexibility in a dynamic way: first, the context (more precisely the co-text) specifies the syntactic category in which the item is used; then the variation of the syntactic scope of the morpheme produces its polysemy by triggering variation in its semantic scope and the activation of contextual properties. I name this model of analysis “fractal grammar” (Robert 1997, 2003a). This is not a mathematical model. I have taken from fractals (Mandelbrot 1975) two properties that were

⁵ This paper is largely based on two recent articles of the author (Robert 2003a and 2003b), published in French in S. Robert (éd.), 2003, *Perspectives synchroniques sur la grammaticalisation: Polysémie, transcategorialité et échelles syntaxiques*, Collection *Afrique et Langage* n°5, Editions Peeters, Louvain.

enlightening to me for the analysis of the functioning of transcategorial morphemes:

1. Objects are said to be fractal (Sapoval, 1997: 73, 136; Gleick, 1991: 128) when they have the property of scale invariance and self-similarity: *a similar structure* appears at different scales and objects are invariant when undergoing a *dilatation in the scope* of the observation. A coast, a tree branch or a snow flake for instance are fractal objects, because the structure they show when observed at different scales is similar: a broken line in the case of a coast or a ramified structure for a tree branch.
2. The common structure appearing at different scales is similar but not strictly identical: each scale also has specific scale properties so that there is no strict identity between the structures appearing at different levels. Rather, we have an *analogical* structure.

In the case of transcategorial morphemes, the analysis I propose in order to account for the syntactic and semantic flexibility of the linguistic units, relies on two basic mechanisms that are comparable to these two properties of the fractal objects. By definition, a transcategorial morpheme is used on different syntactic levels with a different syntactic scope (for instance, as a noun, as a preposition, as a subordinating conjunction). The linguistic “scale” corresponds here to the “syntactic level” at which the unit functions. The transcategorial functioning can be explained by the two following mechanisms:

1. Through the different syntactic uses of the term, a similar semantic structure (a “schematic form”) is abstracted and preserved, which constitutes the unity of the morpheme.
2. In each use, the category change activates different properties specific to the syntactic category in which the term functions; therefore in the different uses (e.g. as a noun, as a preposition or as a subordinating conjunction...), the semantics of the morpheme undergoes a dilatation of its syntactic scope (see below for details) along with particular specifications that produce the variations among the different uses. I call the semantic and syntactic properties specific to each syntactic category, “level (or scale) properties”. Thanks to these properties, the semantic structure common to the different syntactic uses is *similar* (or analogical) but not strictly identical.

When a linguistic unit, besides being used as a preposition, is also used as a subordinating conjunction (e.g. *ginnaaw* presented in 2.2.), the constituent modified by the unit is one of greater complexity and belongs to a higher level of the structural hierarchy (here, a clause *vs* a noun phrase). Therefore, considering that a similar semantic structure is

applied in these different uses of the transcategorial morpheme, one can say that, from one use to another, the semantics of the morpheme undergoes “a dilatation (or expansion, increasing) of its syntactic scope”: the scope element (or domain of application) of the transcategorial morpheme corresponds to a larger and more complex unit of the syntactic hierarchy (cf. scale properties 2, in 2.4.: “domain of application and scope of the term”).

I have to add an important factor in the dynamics of this model: in the case of transcategorial morphemes, since the morphosyntactic category of the term is not specified *a priori* (the unit can function in different categories, such as preposition or subordinating conjunction...), the *context* is the triggering factor for the activation of the syntactic properties (level properties) of the category in which the morpheme functions in each of its uses, because its syntactic role and status is defined by its place and environment inside the utterance. All linguistic morphemes are context-sensitive in the way that their semantic value depends partly on their semantic environment (*tender* does not have the same meaning in *a tender steak* and in *a tender man*) but transcategorial morphemes have a particular property: they are also syntactically context-sensitive. This means that their morphosyntactic status depends on their position inside the utterance and on their syntactic environment: for instance, when English *now* is used after a verb, it functions as a temporal adverb, while before a clause it functions as a discourse particle; in the same way, when the Wolof *ginnaaw* is used after a verb ad before a noun phrase, it functions as a preposition, while before a clause it functions as a subordinating conjunction.

I am now going to present this model in greater detail by illustrating it with various examples. But one can already see what is meant by the notion of ‘fractal’ functioning. The transcategorial morphemes are said to be fractal because of their ability to be used synchronically in different syntactic categories with increasing (or decreasing) syntactic scope; here the semantic structure (or schematic form) common to the various uses plays the role of the “scale invariance” and the semantic and syntactic properties specific to each syntactic category producing the variation play the role of the “scale properties” of fractals. The different scales here are not scales of observation (as for fractals objects) but scales of functioning, *i.e.* they correspond to the syntactic levels defined by the syntactic categories in which the transcategorial morphemes are used. The scale properties of linguistic units are general properties of the syntactic categories; they are activated in the particular uses of the transcategorial morpheme and interact with its common semantic structure in order to produce its sense in the particular use.

2.2. Scale invariance: the common “schematic form”

Let us first take a simple example. In Tupuri (Adamawa, Cameroon), the verb ‘to enter’ is also used as an ingressive auxiliary, *kàl* (Ruelland 2003). This is a very common case of grammaticalization of a movement verb into an aspectual auxiliary.

The common semantic properties of these two uses, and therefore the semantic unity of the term, can be accounted for by considering that through the different syntactic uses of the term, a similar semantic structure is abstracted and preserved but mapped onto two different domains. This common semantic structure corresponds here to the notion (or the schema) of ‘entrance’; in the use as a movement verb, the domain in which it applies is a place (entrance into a physical space), while in the use as an aspectual auxiliary, it is a process (entrance into a process). Note that this common semantic structure is not a concept but an abstract semantic schema, what Culioli ([1978 et 1987] 1990 : 115-135) calls a “schematic form”, Lakoff (1987) “an image schema”, or Michaelis (1996), a “semantic super-structure”. The use of this schematic form as an aspectual morpheme is made possible by the fact that aspect is conceptualized as a topological domain whose properties are comparable to those of space. Probably because of a fundamental analogy between space and time existing in our cognitive processes⁶, the schematic form common to a movement verb and an ingressive auxiliary seems to be quite obvious. However, the different domains onto which the common schematic form is mapped can be more abstract than space and time.

In Nêlêmwa (Oceanic, New-Caledonia), for instance, the morpheme *r/toven*⁷ functions as a verb ‘to finish’ (cf. 1), as an aspectual modifier with a terminative value (2), and as a nominal quantifier with a totalizing value, ‘all’ (3).

⁶ Aspect can be defined as the “situation-internal time” (Comrie 1976: 5).

⁷ *Toven* is the strong form for the verb, *roven* the weak form for the verb modifier and nominal quantifier (Bril 2003). According to Nêlêmwa’s morphology, the two forms are clearly two variants of the same stem. Concerning the question of transcategoriality, we can consider that this split into two distinct forms corresponds to what Anward (2000: 32) has called “marked recycling” of parts-of-speech vs “simple recycling”; for reasons of space, I cannot present this aspect of transcategorial functioning, i.e. morphologically marked vs unmarked category change (see Robert 2003b), but even if the case of the verbal use is left out of the discussion because it is morphologically not strictly identical to the two other uses, the two other cases can nevertheless be explained by fractal grammar.

- (1) *co toven o khiiboxa pwaxi-m tavia !*
 2SG finish LOC beat child-POSS.2SG dog
 ‘Stop beating your dog!’
- (2) *i u keva wany xe wagiik... xa keva roven*
 3SG ACC build boat TOP a... also build finish
wany hleny
 boat this.DEICT
 ‘He has built a boat... and this boat is finished’
- (3) *hla vhaa agu roven*
 3PL talk people all
 ‘Everybody is talking (about it)’

Following Bril (2003) from whom these data are taken, we can state that through these different uses, this morpheme indicates a single semantic operation which constitutes the common schematic form of the term, namely a totalizing quantification of a domain that can be (1) the temporal extension of an event, (2) the aspectual phase of a process, and also (3) the set of elements constituting a (nominal) class.

With a third example, I would like to show that the increase in the syntactic scope of transcategorial morpheme (and the “dilatation” of its semantic scope) can reach the highest linguistic level, namely the discourse level. I have chosen the case of *ginnaaw* in Wolof (Atlantic, Senegal) because this morpheme, interestingly, functions in three different syntactic categories and, thanks to a detailed study of its uses in context, I have been able to propose a unitary analysis of the common schematic form underlying its various uses (Robert 1997). But I want to point out that fractal functioning at the discourse level is very common, although most of the time the analysis of the schematic form is not easy to provide because it is very abstract. In fact, most discourse particles are fractal morphemes: they apply at different syntactic levels with various syntactic scope, the discursive (or argumentative) use being only the widest one (see Hansen 1998). Thus, as pinpointed by M. Mithun (article in this volume), many languages show an extension of grammatical constructions from the domain of sentence-internal syntax into discourse. For instance, the Navajo =(g)o construction evolved from a derivational adverbializer, used for forming vocabulary, into a marker of subordinate clauses, and finally has been extended to function at the discourse-level, connecting sentences and marking their informational status (backgrounded, descriptive, subsidiary, explanatory, or evaluative information). In the same way, the Hualapai *-k/-m* constructions originated in inflectional oblique case endings, then evolved into markers of syntactic dependency among clauses within a sentence, and, finally,

with a wider scope, they signal textual cohesion and mark statements that together comprise a larger discourse unit. These cases are typical instances of fractal functioning whereby the scope of the morpheme is increased and reaches the highest level of the discourse macro-units.

Turning now to Wolof, *ginnaaw* occurs synchronically in three different grammatical categories. As a noun, it names a body part, the 'back'; as a preposition it means 'behind', in some restricted uses 'after'⁸, but also 'except'. *Ginnaaw* also has a more striking use as the subordinating conjunction 'since' in its causal meaning, much like French *puisque* with its argumentative properties. Examples (4) to (7) exemplify the different uses.

Table 1: *ginnaaw*'s uses and senses

noun (4)	- back (body part)
preposition (5, 6)	- behind; after; except
subordinating conjunction (7)	- since (causal not temporal)

(4) *Jigéen-u Senegaal dañu-y boot seen*
 woman-CONN. Senegal VBFocus3PL-IMPERF carry their
doom ci ginnaaw
 children PREP. ginnaaw
 'Senegalese women carry their children on their backs'

(5) *Mi ngi deck ci ginnaaw jàkka ji*
 3SG...PRESENTATIVE live PREP. ginnaaw mosque the
 'He lives behind the mosque'

(6) *Ginnaaw yaay bi, ñépp ñëw nañu*
 ginnaaw mother the, all come PERF3PL
 'Except for the mother, they all came'

(7) *Ginnaaw faral nga ko, maa ngi dem*
 ginnaaw to.side.with PERFECT.2SG him, 1SG...PRESENT go
 'Since you have taken his side, I am leaving'

Detailed analysis of *ginnaaw*'s uses (Robert 1997) allows me to state that *ginnaaw* defines an asymmetrical space with a front / back orientation

⁸ The temporal sense of *ginnaaw* is possible in its prepositional use but seems to be restricted to the cases where it governs a noun involving time, such as in *ginnaaw ëllëg* (ginnaaw tomorrow) '(the day) after tomorrow', or *ginnaaw añ* (ginnaaw lunch) 'after lunch'. In that case, the temporal domain is shaped as a space. This temporal value is impossible when *ginnaaw* is used as a subordinating conjunction. The subordinating conjunction 'after' is expressed with another morpheme (*bi/ba*): *Bi mu lekkée la dem* (when AOR3SG eat+ANTERIOR. FOCUSCOMP3SG go) 'After he had eaten, he left'.

proceeding from a landmark (or locator) and refers to the space behind it (excluding the landmark). This schematic form is illustrated in Figure 2, where the shaded part designates the space referred to (*i.e.* the figure or profiled substructure, Langacker 1991) by *ginnaaw*:

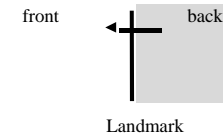


Figure 2 : *ginnaaw*'s schematic form

With this common schematic form, we can account for the observed polysemy, according to the nature of the element functioning as the landmark inside the utterance. So the landmark is the variable producing the polysemy: its syntactic nature defines the category in which *ginnaaw* functions, and, therefore, its semantic and syntactic scope, and the domain onto which it is mapped. When *ginnaaw* is in nominal function no other term in the utterance plays the role of the landmark; the morpheme has extra-linguistic scope and a referential value: the landmark is the primary landmark, namely the human body, hence the meaning 'the back'. When *ginnaaw* governs a noun and is used as a preposition, the landmark is the noun governed by *ginnaaw* (here 'the mosque') and *ginnaaw* refers to the space behind this landmark ('he lives behind the mosque'). If *ginnaaw* is moved to the front of the clause, the scope of the *ginnaaw* phrase is the entire proposition (not just the verb): *ginnaaw* refers to (thus validates) the 'space' behind the landmark, excluding the landmark; the proposition 'they all came' is true only behind the landmark 'the mother'. Hence the sense 'except for the mother, they all came'.

When the landmark is a clause, *ginnaaw* functions as a subordinating conjunction: it expresses a locational relationship between two clauses but not a temporal sequencing (*behind = after P, there is Q). How does *ginnaaw* come to mean 'since' in its causal sense? The answer relies on understanding what a 'landmark' is in discourse. In this third use, the syntactic scope of *ginnaaw* is a clausal complement, not a noun. We are dealing with a complex sentence at the discourse level. According to *ginnaaw*'s semantics, the clause P ('you have taken his side') is the landmark behind which the clause Q ('I am leaving') is located and *ginnaaw* refers to the space behind this landmark. Thus, the main clause ('I am leaving') is the scope of assertion, the focus, and the *ginnaaw*-clause is presented as the starting point of the utterance, that is a topic. This point is confirmed by the syntactic constraints on the order of the clauses: in contrast with another causal morpheme (*ndax* 'because'),

ginnaaw-clauses always appear first (*I am leaving, since-*ginnaaw* you have taken his side); furthermore the *ginnaaw* clause can't be used in an answer to a question ('why are you leaving?')⁹, which confirms its topical status. So taking this topical status into account, we can gloss the *ginnaaw*-complex sentence as following:

'Behind (*i.e.* given) the fact that you have taken his side (P),
there is the fact that I'm leaving (Q)'.

Ginnaaw validates the main clause as a following consequence of the topic in discourse. That is what I have called "argumentative causality" (Robert 1997). So the space validated by *ginnaaw* here is the assertive space, *i.e.* the discourse organization: the proposition is stated as the resulting consequence of a first proposition. Hence the meaning 'since you have taken his side, I'm leaving' and the argumentative effects of the *ginnaaw* assertion: I (the speaker) am not responsible for the situation and its consequences, I'm only describing what results from an already validated statement (*cf.* the epistemic status of the topic as an already known and established fact). Noticeably, this use of a spatial morpheme for expressing argumentative causality and clause chaining shows that discourse is conceptualized here as a space with topological properties, analogical to the properties of physical space. In metaphor theory (Lakoff 1987), we could say that the metaphor at work here is the metaphor of the discourse as a landscape which the speaker is moving in, with independently established landmarks (topics, statements), point of view, back-front orientations and progression.

So, through these different uses of *ginnaaw*, we can see the construal of a common schematic form (or image-schema), as sketched in Figure 2, which is abstracted from one use to another and mapped onto different domains (the referential domain of lexicon when used as a noun, the domain of noun phrase when used as a preposition, and the domain of the clause when used as a subordinating conjunction), with a corresponding increase in its syntactic and semantic scope (lexicon, prepositional noun phrase, subordinating clause). Therefore this schematic form can be said to be the "scale invariance property" of the morpheme and to constitute the unity of the transcategorial morpheme.

2.3. Schematic form: beyond semantic generalization, a matrix form

The semantic change happening in grammaticalization has often been analyzed in terms of desemantization (Meillet 1912), semantic bleaching

⁹ or only when the sentence is marked by a special cohesive anaphoric intonation which confirms its topical status.

(Givón 1975) or erosion (Lehmann 1982), that is as a semantic reduction or loss. In the shift from a lexical to a grammatical use, there is a loss of "semantic flesh". But more needs to be said, because grammatical morphemes do have meaning, too. Concerning the semantics of grammaticalized terms, several authors (Hagège 1993: 212, Hopper & Traugott 1993: 96, Bybee *et alii* 1994: 9) have noted that, most of the time, the lexical units entering into grammaticalization have a general meaning (they are hyperonyms or super-ordinate terms corresponding to basic level terms): 'go' (rather than 'run'), 'give' (rather than 'offer'), 'have' (rather than 'own'). Following Langacker's analysis (1987, 1991), we can account for this fact by considering that hyperonyms are more schematic than hyponyms, which are more specific: since the semantics of grammar is more schematic than that of the lexicon, it is natural that the most schematic elements of the lexicon are those which tend to evolve into grammatical morphemes. But the same authors have also noted that this general rule is not absolute and suffers from a number of exceptions: less general (or more specific) terms can also grammaticalize, as in the case of anteriors arising from 'finish', 'throw away', and 'pass by'; of futures arising from "want" or 'desire'; and obligation markers from 'be proper or fitting' and 'owe' (Bybee *et alii: ibid.*). The proposed explanation of these exceptions to the rule of 'general meaning' is that, in order to enter into a grammaticalization process, the morpheme first has to undergo 'semantic generalization' (*ibid.* and Bybee 2003). So the semantic changes which lead to grammaticalization are characterized by these linguists as changes that increase the generality of the meaning of terms.

I want to point out that the fractal model can bring more precise answers to these questions concerning the semantics of transcategorial morphemes and the nature of semantic change in the process of grammaticalization. First, although the semantic change from a lexical to a grammatical meaning does involve a kind of semantic generalization, the notion of generalization is nevertheless not sufficient to account for the precise semantics of the gram. One has to describe what is retained from the lexical meaning in the grammatical use, not only in order to account for the semantic change and the commonalities between the different uses of the term, but also in order to describe the specific semantics of the gram: not all futures, for instance, have the same meaning (*e.g.*, there are futures expressing probability *vs.* certainty); in other words, they do not necessarily rely on the same schematic form or construal (Langacker 1991). The analysis of grammaticalization in terms of a topologically structured schematic form, abstracted and preserved from one domain to another as is proposed here (see also Sweetser 1988, Talmy 2000), gives a more precise account of the grammatical meaning: from the lexical meaning only a schema is retained, and what is preserved in the

grammatical use is not simply a ‘feature’ (like the feature ‘future’) but a semantic structure, ‘a form’. This preserved schematic form gives its shape to the meaning of the gram. So the semantics of the gram is shaped by the schematic form abstracted from the lexical use.

Let us take an example. Tupuri has two terms that can be used as prepositions with the meaning ‘in, inside’: one (*nēn*) comes from the noun ‘eye’, the other one (*bīl*), from the noun ‘belly’ (Ruelland 1998): the same spatial value seems to have been abstracted from two different lexical units. However, the constraints on their grammatical uses reveal that the two are not synonymous: two different conceptions of ‘interior’ are involved. In our terms, we would say that the spatial uses of (*nēn*) and (*bīl*) rely on two different schematic forms (or topological configurations), abstracted from their different lexical meanings: in the case of ‘eye’, the interior is a compact domain, while in the case of the ‘belly’ it is a hollow interior. Therefore, ‘belly’ cannot be used to say ‘inside the forest’, because a forest is a compact domain, not a hollow; conversely, ‘belly’ will be used to say ‘in a hole’, where ‘eye’ is not possible because a hole is not a compact domain.

Thus, the schematic form is not a simple semantic feature, it is a semantic form that serves as a “*matrix*” for the construal of new meanings, when mapped onto new domains: it is a form used for generating new meanings in a dynamic process. This concept can explain how grammatical semantics can emerge from lexical meaning and also account for apparent but deceptive grammatical synonymy. As a corollary, it can explain why potentially all kinds of terms (general or specific) can grammaticalize and also why hyperonyms do so more often. A schematic form can be abstracted from any lexical term presenting such a form in its (poorer or richer) semantics, because it consists of the *selection of a substructure* inside the lexical meaning; such a form can be present in the semantic structure of very different terms. For instance the discrepancy between a temporal starting point and a prospective targeted point, as expressed by future in many cases, can be abstracted from movement verbs (French *aller*), but also from verbs of will (English *will*), of transformation (German *werden*), or of permission (Maltese *halli* ‘let’), because they all have such a schema (or substructure) in their various meanings. But hyperonyms grammaticalize more easily because they are more schematic and less stuff of the lexical component has to be eliminated in the process of schematization. In this way, the fractal model explains how grammaticalization (or more generally semantic change) is motivated (and not random) but not strictly deterministic: certain terms are more likely to be grammaticalized because their semantic structure is closer to the schematic semantics of grammatical categories, but one cannot strictly

predict from which term the schematic form of the grammatical morpheme will be abstracted.

The second aspect on which the fractal model can shed new light is precisely that of semantic loss and gain between lexical and grammatical uses. Everyone agrees that during the grammaticalization process, the morpheme loses some semantic components of its lexical meaning. How can we describe what is lost and by which linguistic mechanism it happens? Furthermore, as noted by several authors (Sweetser 1988, Hagège 1993, Bybee *et alii* 1994), in its grammatical uses, the gram is also enriched by the semantics of the new domain it is applied to and therefore gains new semantic specifications. The fractal model accounts for this “resemantization” of grammatical uses, and more generally for the difference between the various uses of a transcategorial morphemes, with the mechanism of “scale properties” (or level properties). In fact, the schematic form does not represent the semantics of the term in its different uses but the *common schema* underlying the various senses and grounding the unity of the morpheme, *i.e.* the matrix of the change. In language use, the schematic form never appears as such, it is always instantiated in a particular use and therefore enriched by its specific properties. Even in the case of the most grammatical uses, the semantics of the transcategorial morpheme is not reducible to the schematic form. There is also another mechanism at work in the meaning construal of each sense of the transcategorial morpheme. That is what I am going to present now.

2.4. Scale properties and the construction of variation

Despite a common semantic structure, a transcategorial morpheme shows different syntactic and semantic properties in its various uses. The mechanism explaining the semantic and syntactic variation from use to use is the activation of different “scale properties” in each use, according to the following process: (a) the position of the term inside the utterance specifies its categorial status (as a noun, as a preposition, or as a verb suffix, e.g.); (b) its functioning in a specific category triggers the activation of the properties of this category, that is, properties specific to the syntactic level and category in which the morpheme functions in its various uses (“scale properties”). Indeed, the specificity of transcategorial morphemes is that they show a syntactic flexibility by which they are recategorized in discourse or, depending on the language type, simply categorized in discourse (cf. section 2.5.3.): according to their particular use in discourse, they will acquire the different properties of the morphosyntactic category (or part-of-speech) in which they function.

I am going now to present and illustrate the different scale properties that I have observed. The list is certainly not exhaustive since the scale properties involve all the properties of linguistic categories. But what is presented here is an explanatory mechanism. It is worth noticing that the nature of scale properties is *language specific* (they can vary according to the categories, structures and rules of the given language) but that their existence is postulated as universal.

1. *Triggering factor*: The position of the term in the utterance, and the nature and order of the surrounding terms specify the syntactic category in which the term functions in its particular use, according to the patterns of sequential arrangement of the language.

For instance, according to the syntactic pattern of Wolof, the position of *ginnaaw* before a noun activates its functioning in the category of prepositions; before a clause, in the category of subordinating conjunctions. It is worth noticing that this dynamic model supposes that, in language comprehension, the syntactic status of the transcategorial morpheme can be retroactively specified after a (short) phase where it is ambiguous, with possible garden-path effects: for instance, in Wolof, a sentence can begin with a noun, so when *ginnaaw* appears first, it can be understood either as a noun, or as a preposition (“except”), or as a subordinating conjunction. However, most of the time (i.e. except in generic uses), the Wolof noun is followed by a noun modifier (article or demonstrative), so when the noun modifier appears after *ginnaaw*, the morpheme is clearly understood as to be functioning as a noun in a noun phrase (e.g. “the back is the most fragile body part”). When followed directly by a noun (or a noun phrase), *ginnaaw* can be interpreted either as a preposition (“except”) governing this noun, or as a subordinating conjunction followed by the subject of the clause, but this ambiguity will be solved with the next component: if it is a verb, then *ginnaaw* is in its subordinating use and the noun is the subject of this verb, if it is another noun or a pronoun, *ginnaaw* is a preposition. When followed by a verb, *ginnaaw* is necessarily interpreted as a subordinating conjunction (cf example 7).

In the same way, according to the syntactic pattern of Nélémwa, the postposition of *roven* to another verb activates its functioning in the category of verb modifiers, its postposition to a noun, in the one of nominal modifiers.

The functioning in a specific category activates the following scale (or level) properties:

2. *Domain of application and scope of the term*

At the nominal level, the term has *referential* scope, a denotational value; the schematic form is instantiated in a specific domain (e.g. the body, in the case of *ginnaaw*), which is not deducible from the linguistic context but encoded in the language. The schematic form is then enriched by two scale properties of the lexicon; the specific referential domain it applies to, and also what I have called the “depth dimension” of the lexicon (Robert 1999), that is the semantic frames, the various scenarii, the physico-cultural properties, and the connotations associated with the term.

These properties are not present in the grammatical uses. In contrast to the lexical uses, in its grammatical functioning, the morpheme has *relational* and *intradiscursive* scope: the domain onto which the schematic form is mapped is the one defined by the modified term (e.g. ‘the mosque’ in the example of the prepositional use of *ginnaaw*, the complexe sentence in its subordinating use).

For instance, in its nominal use, *ginnaaw*’s meaning is enriched by the physico-cultural properties and connotations associated with the body-part ‘the back’, in the depth-dimension of the lexicon: that is a part of himself that the person cannot see, where things can happen to him without being foreseen; that is also where Senegalese women carry their children but not their burdens (which are carried on the head).

So, what is lost going from a lexical to a grammatical use is the referential properties and the depth-dimension of lexicon. What is preserved is the schematic form. What is gained is, first, the properties of the domain defined by the modified term, and second, the following linguistic properties.

3. *Paradigmatic properties*

In each use, the term belongs to a different paradigm with specific oppositions that contribute to specify its sense. One can suppose that the different paradigms to which the item belongs in its particular uses contribute to specify its sense because the unit then occupies a certain place in a variable semantic space defined by the set of items constituting this paradigm.

For instance, as a noun, *ginnaaw* belongs to the paradigm of body-part terms as it is conceptualized and categorized in Wolof; in its prepositional use it belongs to another paradigm, the one of prepositions, which is made of a restricted number of body-part terms but also of other terms. So the representational space occupied by *ginnaaw* is different in the two cases. In its subordinating use, *ginnaaw* contrasts with another causal subordinating conjunction (*ndax*), by its topical (*vs* focused) status; this

paradigmatic opposition certainly contributes to specify *ginnaaw*'s meaning in its subordinating use.

4. *Syntactic properties of the structural level*

At each level of the syntactic hierarchy a number of specific syntactic properties are attached. The different structural levels generate structures and structural expectations into which the transcategorial morpheme automatically enters. Therefore, when used in a given category, the transcategorial morpheme is subject to the constraints of this category, acquires its functions and receives its specifications. I cannot list exhaustively these well-known properties and rules because they are those of the whole syntax. My point is only to show that they function as rules applying regularly and differently in each use of the term, thus contributing to specify its syntactic behavior and semantic structure. For instance, a nominal phrase requires modifiers, has an argumental function in the clause, can be complemented and so on. Depending on the rules of the particular language, a verb phrase may require aspecto-temporal specifications, have a certain valence, create a nuclear relation with the subject when used as a predicate, etc. At the clause level, the structure of the predicative relation is activated, and has to be saturated.

More generally, the various constructions in which the morpheme can be used and the meaning of these constructions also contribute to specify the semantics of the morpheme in its particular use; construction grammar (Fillmore *et alii* 1988, Goldberg 1995, Croft 2001) is also a component of scale properties in this fractal model.

Finally, I want to emphasize that the discourse level also has scale properties: it implies a set of specific components that will be activated and have to be filled in: a point of view (including aspectual perspective), a modal value (assertion, interrogation, epistemic status...), a discursive landmark (the topic), and a focus; in a complex clause, the nature of the relationship between the clauses must also be specified (temporal or causal sequencing, or argumentative orientation), as was the case in the subordinating use of *ginnaaw*, which can explain how the common schematic form can acquire the meaning of causal 'since' when these discourse level properties are applied to it: the schematic form of *ginnaaw* then structures the relation between the two clauses as an orientation at discourse level, *i.e.* as an argumentative orientation of the discourse grounded in the spatial shaping of clause linking.

5. *Semantics of the category, semantics of the function, semantics of the position.* Not all linguists agree on the specific semantics of syntactic categories and syntactic functions, but most of them agree that there is a semantics of morphosyntactic categories (noun, adjective, verb...)

and a semantics of grammatical functions (subject, object, predicate, modifiers, etc.) that can be attached at least to the prototypical members of these categories or functions. These properties also work as scale properties because they bring to the schematic form of the transcategorial morpheme the additional semantic features of the category in which it functions and those of the syntactic function it has in the particular utterance. For instance, A. Wierzbicka (1986) ascribes to the category of the noun the specific semantic feature of 'classification' and to the adjective, that of 'description'. Concerning the semantics of grammatical functions, Langacker (1991) defines the semantic role of the subject as the profiling of a primary figure for the predicative phrase; Croft (1994) characterizes subject and object as 'delimiters' of the verbal causal segment, its initiator and endpoint respectively. In any case, there is a specific semantics attached to the grammatical function independently of the lexical semantics of the term. Once again, these properties are language specific, in the sense that a category might or might not be relevant or have a different status in one language compared to another: for instance, the grammatical function of subject is not relevant in the same way in ergative languages, subject prominent languages or in topic prominent languages. Less controversial and better known is the semantics of the position. In French, for instance, the pre-posing of an (otherwise postposed) adjective changes its meaning from a descriptive to an evaluative one: *un homme grand* ('a tall man'), *un grand homme* ('a great man'). In Nêlêmwa, according to the general rules of the language that apply to numerals too, the meaning of *roven*, when used as a nominal quantifier, depends on its position: before the nominal phrase, *roven* indicates a fraction of discrete units (*roven*+NP = 'all the...'), while postposed to the noun, it refers to a globality: NP+*roven* = 'the whole...' (Bril 2003).

6. *Restrictions or loss of combinatory restrictions specific to the category* also function as scale properties. For instance, when used as an auxiliary, a verb loses the restrictions on the selection of the subject (or complement) it had in its lexical uses: the subject of 'go' as a movement verb has to be capable of physical or fictive motion (as in *the road goes to the beach*), while it does not when the verb is used as an temporal auxiliary.

7. *The scope of anaphora and co-reference* are also defined by the category in which the unit functions. As exemplified by Haspelmath and König (1995), when converbs grammaticalize in prepositions, they lose the constraint of subject co-reference, as in *considering his age, he has made excellent progress in his studies*.

This list is certainly not exhaustive; for instance, intonation should be added as another scale property that shapes the meaning and function of the item in a particular use. However it outlines a powerful mechanism explaining how the variation of the meaning of transcategorial morphemes is regularly constructed and specified in discourse, thanks to the general properties of syntactic categories and parts of speech.

2.5. Limits and refinement of the model

The fractal model does not intend to account for all cases of polysemy, but only for those correlated with a change of category, *i.e.* for transcategorial functioning. However, even when restricted to this specific case, this model still presents some limitations and should be refined.

2.5.1. Persistence (or remanence) of scale properties

As we said, different scale properties are supposed to be activated in the various uses of the transcategorial morpheme. This implies that the scale properties of one syntactic level are inhibited when those of another one are activated. However, when one use emerges from a previous one (diachronic grammaticalization), some properties of the former use may remain in the new one: specific features of a syntactic category can persist even though the item is used in another syntactic category. Several authors have noted that some semantic features of a previous lexical use can persist when a morpheme is grammaticalized; this phenomenon what is called “persistence” by Hopper (1991) and “retention” by Bybee *et alii* (1994). The persistent features of a previous (or another) use of a transcategorial morpheme in another one are not only semantic; they can also be syntactic. What I call the “persistence” (or remanence) of scale properties” is the fact that semantic or syntactic features of the previous syntactic category the morpheme was functioning in before can be retained in its new use. Such cases of persistence are well attested and can explain some heterogeneities in linguistic systems. While using other terms for describing this phenomenon, Hagège (1990: 138), for instance, gives a clear illustration of it. In French, some participles have grammaticalized into prepositions, such as *durant* (‘during’) or *excepté* (‘except’) in *durant des années* (‘during (several) years’) and *excepté les fillettes* (‘except the little girls’). The origin of these adpositions in participles is visible in some residual uses of them as postpositions, with a non canonical word order (French otherwise uses the system of prepositions) as in: *que tout le monde sorte, les fillettes excepté* (‘everyone leave, except the little girls’); as a relator *excepté* does not agree with the noun (*les fillettes*); however in this use, the nominal phrase presents an unusual word order (the relator is postposed to the complement). This heterogeneity in a system of adpositions comes from the retention, in

their use as relators, of the specific word order of the categories from which the adpositions have arisen (here the participles). The same is true and even more systematic in Chinese, which has both prepositions and postpositions (*ibid.*: 139). Chinese prepositions come from verbs and have maintained, in their use as relators, the word order of verb phrases (verb+object > relator+complement) as exemplified in (8), while postpositions are derived from nouns and have retained the word order of noun phrases (complement+head noun > complement+ relator), as in (9):

(8) *song gei xuesheng*
 send give/to student
 ‘to send to a student’

(9) *zhuozi shang*
 table summit/on
 ‘on the table’

Heterogeneities in syntactic systems, as in the case of French or Chinese adpositions, appear to be produced by regular rules, if we just admit that syntactic categories are not fixed and static entities, but patterns of functioning which constantly operate in discourse, reshaping the linguistic units and their categorial status, as stated also in the framework of emergent grammar (Hopper 1987) and radical construction grammar (Croft 2001).

2.5.2. On grammaticalization chains and extensions

As presented here, the fractal model relates each particular use of the transcategorial morpheme to a common matrix (the schematic form); it does not integrate the particular “chains” connecting the various uses together. Now, as exemplified by Craig (1991) or Heine and Kilian-Hatz (1994), in some cases, the different uses of the term do not seem to be directly related to a common matrix, but rather to one another in a network of polydirectional grammaticalization chains. In the analysis of *te* presented by Heine and Kilian-Hatz (see Figure 1), the different uses of *te* are related to a central value, the one of comitative, but, for most of them, through the mediation of one or several other uses: for instance, the use as an introducer of purpose subordinating clause is only *indirectly* related to this central value, through the mediation of the use as a directional particle. This does not mean that the different uses are not also connected to a common schematic form, but the fractal model should include the dimension of grammaticalization chains (Heine 1992). Furthermore, it is well known that grammaticalization may also be produced by various extensions such as metonymy or by grammaticalization of pragmatic inferences, or semiotic metonymy

(Frajzyngier 1996). In such cases, the matrix of change is clearly not a schematic form. Therefore, if the process of metonymic extension does coexist with the one of schematization for a particular morpheme, a more comprehensive model of language change should add another dimension. This model could then be represented as in Figure 3.

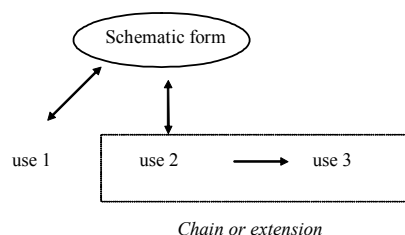


Figure 3 : Refined model

2.5.3. Typology of transcategoriality

Before coming to a conclusion, I want to mention briefly how the theoretical questions raised by transcategorial morphemes could be refined by a typological study on transcategoriality. In a preliminary study (Robert 2003b), which I will summarize in a nutshell, I have investigated the various modalities of transcategorial functioning in fifteen languages from different families. This analysis was based on a collective work (cf. Robert ed. 2003), a questionnaire that I have submitted to my colleagues of the LLACAN¹⁰, and also occasional personal incursions into other languages (Basque and Japanese). The languages on which this first sketch relies were mainly African languages (Niger-Congo and Nilo-Saharan), but also included Afroasiatic, Oceanic, Japanese and Basque. In these languages I have examined:

- the relative proportion of transcategorial morphemes in the language compared to the morphemes whose categories are fixed
- the nature of the class change (noun to preposition, verb to particles...)
- the scope of change in each case
- the marking (vs. non marking) of class change
- the synchronic vs. diachronic character of transcategoriality
- the morpho-syntactic characteristics of the languages

¹⁰ Isabelle Bril for Nêlêmwa, Bernard Caron for Hausa France Cloarec-Heiss for Banda-linda, Alain Delplanque for Dagara, Marcel Diki-Kidiri for Sängö, Sylvester Osu Ikwere, Paulette Roulon-Doko for Gbaya, Suzanne Ruelland for Tupuri, Marie-Claude Simeone-Senelle for Modern South-Arabic, Martine Vanhove for Maltese. Special thanks go also to Didier Bottineau for his contribution on Basque. Possible mistakes are mine.

The results showed different kinds of transcategorial functioning. Depending on the language, transcategoriality is:

- massive vs. more restricted
- more synchronic vs. more diachronic
- oriented (and marked) vs. non oriented (direct)

Interestingly these different modalities of transcategorial functioning correspond to different morpho-syntactic types of languages. So there are structural tendencies to transcategoriality that can be related to the economy of the linguistic systems, crucially to the different strategies for the distribution of grammatical information. I have identified three types of transcategorial strategies which I call oriented transcategoriality, generic transcategoriality, and functional transcategoriality.

(1) In languages with heavy morphology (e.g. inflectional languages, such as the Hausa, Maltese and Modern South Arabic languages in the study), the category change is limited (mostly to the verb) and directed from a source category to a target one, mostly through a diachronic process: for instance, full verbs are the main source of auxiliaries, of some adverbs, subordinating conjunctions or discourse particles; the grammaticalization of nouns is rarer and essentially concerns body part terms giving rise to spatial prepositions. Noticeably polyfunctionals (i.e. grammatical morphemes used in different categories without lexical use) are very rare; if they do exist, they always arise from other grammatical categories, such as deictics or indefinite pronouns.

This type is called “oriented” transcategoriality and corresponds to the classical cases of grammaticalization. It can be related to a synthetic and grammatical strategy for the distribution of syntactic information. Because of inflectional morphology, the language units are here altogether semantic (notional) units, category indicators and relational nodes or centers. Since the syntactic categories are marked on the units, the units tend to be more fixed in a given category, so they have a restricted combinatory latitude (they combine with a more restricted number and type of constituents) and transcategorial functioning in synchrony: the category changes require time, morphological erosion and lead to freezing (the unit is fixed into the new category). The counterpart of this categorial rigidity is the synthetic character of the distribution of information.

(2) In languages with light morphology (e.g. isolating languages, Banda-Linda, Gbaya, Sängö, Tupuri, Dagara, Ikwere and Nêlêmwa, in the study), the language units appear as generic notions which are either not categorized at all or (are) only weakly pre-categorized and can be instantiated in various categories; their syntactic status is specified by the discourse (these are known as “type-token” languages); most of the time,

one use can hardly be derived from another. Transcategoriality is then massive, polydirectional (weakly oriented from a source category to a target), unmarked most of the time, synchronic and transparent. Body part nouns, for instance are used as spatial prepositions but also as morphemes expressing “self”, reciprocal (Sängö), or temporal or causal conjunctions (Tupuri). Unlike the previous type, in these languages, connectors and subordinating morphemes come from other categories (nouns, verbs, adverbs...). We can also notice that, most of the time, these languages have one (or two) “archi-relators (archi-fractals)”, with highly variable syntactic scope (introducing complement nouns, dependent predicates, relative clauses, circumstantial subordinating clauses, or marking topic or focus).

This type is called “generic” transcategoriality: it arises from an initial categorial under-specification and can be related to an analytical and lexical strategy for the expression of grammatical relations. There is no morphological marking of syntactic categories and syntactic relations in these languages; so the morphemes appear as generic units that are underspecified in some aspect (their referential domain in the lexicon, their syntactic categories in utterance) and have therefore a large combinative latitude (derivation is limited while compounding is highly productive). In the economy of these systems, more compositionality is the counterpart of the flexibility of the units and their high combinatory latitude.

(3) Finally, a third type of transcategorial operation is exemplified by some agglutinating languages like Basque or Japanese. The Basque language combines two distinct processes for the distribution of information in the sentence: (a) the case markers which indicate the semantic roles of the components, and (b) the agreement markers on the predicate, which specify their syntactic roles. This dissociation between semantic and syntactic roles allows the case markers to function with different components, on different syntactic levels. For instance, when the scope of the morpheme *k* indicating the semantic role of source or origin, is on a noun, it indicates the source of a process (the agent) or its spatial or temporal origin, but when it has scope over a clause, this morpheme indicates that the clause with *k* is the origin of the following clause and turns it into a conditional clause (Bottineau 2003).

In this case, transcategoriality does not proceed from category crossing (as for oriented transcategoriality), or from category specification in discourse (as for generic transcategoriality) but from the functional distribution of semantic vs. syntactic roles. I call it “functional transcategoriality”. It corresponds to a selective strategy for grammatical information (semantic roles and syntactic roles are expressed by distinct

units). Due to this functional distribution, the morphemes expressing semantic roles can apply to various syntactic structures whose status is specified by argument markers.

Through these different cases, we have caught sight of the important part played in the propensity of a language for transcategoriality by the distribution of the grammatical information and the dissociation of conceptual components from relational components. The more autonomous the grammatical markers are (analytical strategy), the easier the category changes for linguistic components are. The various predispositions of a language to transcategoriality can be related to the nature of the linguistic system and are therefore at least partly predictable.

Conclusion

As a conclusion, I would like to return to the question of the status of linguistic categories raised by transcategorial morphemes. When linguistic units function synchronically in different categories, does the unity of categories and speech parts vanish in their various uses? Do we have fuzzy categories or continuous categories, as in the prototype model? If the categorial status of a linguistic item is constructed in discourse, does it mean that the linguistic categories are emergent (Hopper 1987, Bybee & Hopper 2001)? This depends on the level of analysis we are considering: the pattern of the language system, *or* the way the categories work in discourse. What fractal functioning reveals is *categorial flexibility* on the part of certain units. However, even if the membership (of these units) in a category is constructed in discourse and triggered by the position of the morpheme and its environment in discourse, it is nevertheless the case that the category pre-exists *in the linguistic system* as a model of functioning. Furthermore, as pointed out by Croft (2001: 78), even in the languages that are claimed to lack part-of-speech distinctions, a distributional analysis shows that the parts of speech do exist but are covert. In other words, (1) in every language, even the massively transcategorial languages, *models and types of categories* do exist, with discrete boundaries, but all languages allow, to various degrees and with various constraints, certain units to change their categories and therefore to adopt the functional features of the new category. Such are the dynamics of linguistic systems. (2) Fractal grammar shows that there is continuity in semantics through the schematic form, but the (level or) scale properties introduce discontinuity into the semantic continuum. (3) During their historical development, languages may “crystallize” certain uses; the membership of a unit in a category is then frozen. That is the endpoint of the classic case of

grammaticalization. (4) Languages also show a variable propensity for categorical flexibility vs. rigidity, which defines different types of transcategorial functioning.

References

- ANWARD, JAN. 2000. A dynamic model of part-of-speech differentiation. Approaches to the Typology of Word Classes, ed. by Petra M. Vogel and Bernard Comrie, 3-45. Berlin: Mouton de Gruyter.
- BOTTINEAU, DIDIER. 2003. Syntaxe génétique et typologie cognitive : la genèse des énoncés basque, anglais et japonais. Paper presented at 10ème Colloque International de Psychomécanique du Langage, Oloron-Sainte-Marie.
- BRIL, ISABELLE. 2003. Quantification, aspect et modalité : phénomènes de portée et d'échelle, quelques exemples en nêlêmwa. Perspectives synchroniques sur la grammaticalisation: Polysémie, transcategorialité et échelles syntaxiques, ed. by Stéphane Robert, 53-68. Louvain: Editions Peeters.
- BYBEE, JOAN, PERKINS, REVERE and PAGLIUCA, WILLIAM. 1994. The evolution of Grammar. Tense, Aspect and Modality in the Languages of the World. Chicago and London: The University of Chicago Press.
- BYBEE, JOAN and HOPPER, PAUL (eds.) 2001. Frequency and the Emergence of Linguistic Structure. Typological Studies in Language 45. Amsterdam: John Benjamins.
- CRAIG, COLETTE. 1991. Ways to go in Rama: a case study in polygrammaticalisation. Approaches to grammaticalization, ed. by Elisabeth Closs Traugott and Bernd Heine, 455-92. Amsterdam/ Philadelphia: John Benjamins.
- CROFT, WILLIAM. 1994. The semantics of subjecthood. Subjecthood and Subjectivity. The status of the subject in linguistic theory, ed. by Marina Yaguello, 29-76. Paris/Gap/London: Ophrys/Institut français du Royaume-Uni.
- . 2001. Radical construction grammar: syntactic theory in typological perspective. Oxford: Oxford University Press.
- CULIOLI, ANTOINE. 1990. Pour une linguistique de l'énonciation.vol. 1, Opérations et représentations: L'Homme dans la langue. Paris / Gap: Ophrys.
- FILLMORE, CHARLES F. 1988. The mechanisms of 'construction grammar'. Paper presented at Proceedings of the Annual Meeting of the Berkeley Linguistics Society.
- FRAJZYNGIER, ZYGMUNT. 1996. Grammaticalization of the Complex Sentence: A case study in Chadic: Complementary Series to the Study in Language. Amsterdam & Philadelphia: John Benjamins.
- GIVÓN, TALMY. 1975. Serial verbs and syntactic change : Niger-Congo. Word order and word order change, ed. by Charles N. Li, 17-112. Austin: University of Texas Press.
- GLEICK, JAMES. 1991. La théorie du chaos. Paris: Flammarion.
- GOLDBERG, ADELE E. 1995. Constructions. A Construction Grammar Approach to Argument Structure: Cognitive Theory of Language and Culture. Chicago / London: The University of Chicago Press.
- GÜLDEMANN, T. and RONCADOR, M. VON (eds.) 2002. Reported Speech : A Meeting Ground for Different Linguistic Domains. Amsterdam: John Benjamins.
- HAGÈGE, CLAUDE. 1990. The Dialogic Species. A Linguistic Contribution to the Social Sciences. New-York: Columbia University Press.

- . 1993. The Language Builder: Current Issues in Linguistic Theory 94. Amsterdam/Philadelphia: John Benjamins.
- HASPELMATH, MARTIN and KÖNIG, EKKEHARD (eds.) 1995. Converbs in cross-linguistic perspective: structure and meaning of adverbial verb forms, adverbial participles, gerunds. Empirical Approaches to Language Typology 13. Berlin: Mouton de Gruyter.
- HEINE, BERND, CLAUDI, ULRIKE and HÜNNEMEYER, FRIEDERIKE. 1991. Grammaticalization: A conceptual framework. Chicago: University of Chicago Press.
- . 1991. Grammaticalization: A conceptual framework. Chicago: University of Chicago Press.
- HEINE, BERND. 1992. Grammaticalization chains. Studies in language, 16-2.335-68.
- HEINE, BERND and KILIAN-HATZ, CHRISTA. 1994. Polysemy in African languages: An example from Baka. Sprachen und Sprachzeugnisse in Afrika Eine Sammlung philologischer Beiträge Wilhelm J.G. Möhlig zum 60 Geburtstag zugeeignet, ed. by Thomas Geider and Raimund Kastenholz. Köln: Rudiger Köppe Verlag.
- HEINE, BERND and KUTEVA, TANIA. 2002. World Lexicon of Grammaticalization. Cambridge: Cambridge University Press.
- HOPPER, PAUL. 1987. Emergent Grammar. Berkeley Linguistics Society, 13.139-57.
- . 1991. On some principles of grammaticization. Approaches to grammaticalization, ed. by Elisabeth Closs Traugott and Bernd Heine, 17-35. Amsterdam/ Philadelphia: John Benjamins.
- LAKOFF, GEORGE. 1987. Women, fire and dangerous things: What categories reveal about the mind. Chicago: University of Chicago Press.
- . 1993. The contemporary theory of metaphor. Metaphor and Thought, ed. by A. Ortony, 202-51. Cambridge: Cambridge University Press.
- LANGACKER, RONALD W. 1987. Foundations of cognitive grammar.vol. 1. Stanford, California: Stanford University Press.
- LANGACKER, RONALD. 1991. Cognitive Grammar. Linguistic Theory and Grammatical Description, ed. by Flip G. Droste and John E. Joseph, 275-306. Amsterdam / Philadelphia: John Benjamins.
- LEHMANN, CHRISTIAN. 1995. Thoughts on Grammaticalization: Lincom Europa.
- LORD, CAROL. 1976. Evidence for syntactic reanalysis: from verb to complementizer in Kwa. Paper presented at Chicago Linguistic Society. Parasession on Diachronic Syntax, Chicago.
- MANDELBROT, BENOÎT. 1975. Les Objets fractals, forme, hasard et dimension. Paris: Flammarion.
- MEILLET, ANTOINE. 1912 [1948]. L'évolution des formes grammaticales. Scientia, XII.
- MICHAELIS, LAURA A. 1996. Cross-world Continuity, and the Polysemy of Adverbial *Still*. Space, Worlds and Grammar, ed. by Gilles Fauconnier and Eve Sweetser, 179-226. Chicago and London: The University of Chicago Press.
- MITHUN, MARIANNE. in this volume. On the notion of the sentence as the basic unit of syntactic structure.
- ROBERT, STÉPHANE. 1997. From body to argumentation: grammaticalization as a fractal property of language (the case of Wolof ginnaaw). Paper presented at Proceedings of the 23th Annual Meeting of the Berkeley Linguistics Society (Special Session on Syntax and Semantics in African Languages), Berkeley.
- . 1999. Cognitive invariants and linguistic variability: from units to utterance. Language Diversity and Cognitive Representations, ed. by Catherine and Stéphane Robert Fuchs, 21-35. Amsterdam/Philadelphia: John Benjamins.
- (ed.) 2003. Perspectives synchroniques sur la grammaticalisation: Polysémie, transcategorialité et échelles syntaxiques. Collection Afrique et Langage n°5.

- Louvain: Editions Peeters.
- . 2003a. Polygrammaticalisation, grammaire fractale et propriétés d'échelle. Perspectives synchroniques sur la grammaticalisation: Polysémie, transcatégorialité et échelles syntaxiques, ed. by Stéphane Robert, 85-120. Louvain: Editions Peeters.
 - . 2003b. Vers une typologie de la transcatégorialité. Perspectives synchroniques sur la grammaticalisation: Polysémie, transcatégorialité et échelles syntaxiques, ed. by Stéphane Robert, 255-70. Louvain: Editions Peeters.
- RUELLAND, SUZANNE. 1998. Je pense et je parle comme je suis: le corps, le monde et la parole en tupuri. *Faits de langues*, 11-12.335-58.
- . 2003. Verbes, auxiliaires et déplacements dans l'espace en tupuri. Perspectives synchroniques sur la grammaticalisation: Polysémie, transcatégorialité et échelles syntaxiques, ed. by Stéphane Robert, 127-48. Louvain: Editions Peeters.
- SAPOVAL, BERNARD. 1997. *Universalité et fractales*. Paris: Flammarion.
- SWEETSER, EVE. 1988. Grammaticalization and semantic bleaching. *Berkeley Linguistics Society: Proceedings of the 14th Annual Meeting of the Berkeley Linguistics Society*, 389-409.
- TALMY, LEONARD. 2000. *Toward a Cognitive Semantics*. Cambridge MA: MIT Press.
- TAYLOR, JOHN R. 1989. *Linguistic categorization : Prototypes in linguistic theory*. Oxford: Oxford University Press.
- TRAUGOTT, ELISABETH CLOSS and HOPPER, PAUL. 1993. *Grammaticalization*. Cambridge: Cambridge University Press.
- WIERZBICKA, ANNA. 1986. What's a noun ? (or : how do nouns differ in meaning from adjectives ?). *Studies in Language*, 10.353-89.
- WISCHER, ILSE and DIEWALD, GABRIELE (eds.) 2002. *New Reflections on Grammaticalization*. vol. 49. *Typological Studies in Language*. Amsterdam / Philadelphia: John Benjamins.