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**From body to argumentation: grammaticalization as a fractal property of
language**
(the case of Wolof *ginnaaw*)

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This paper uses the example of *ginnaaw*, a polysemous morpheme of Wolof, to demonstrate that grammaticalization can be understood as one of what may be called the FRACTAL PROPERTIES of language. In fact, *ginnaaw*'s synchronic uses across three syntactic categories (noun, preposition and subordinating conjunction) can be described as a common semantic structure applying at different levels inside the utterance, thanks to the syntactic flexibility of the term. This fractal model can thus account for the phenomenon of grammaticalization and, more generally, the transcategorial functioning of linguistic morphemes, by relating semantic variation (and argumentation) to syntax: the variation of the syntactic scope of the morpheme produces its polysemy. The term *ginnaaw* also reveals connections between body, space, causality and argumentation. These different domains have common topological properties which allow the same term to refer to all of them. *Ginnaaw* expresses a spatial framing in which discourse is shaped in a topological way as a landscape with orientations. The orientation defined by *ginnaaw*'s semantics explains the argumentative values of this morphemeⁱ.

Introduction. Synchronically *ginnaaw* occurs in three different grammatical categories. As a noun, it names a body part, 'back'; as a preposition it means 'behind', and in some extended uses 'after' or '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 (1), (2) and (3) exemplify the different usesⁱⁱ.

ginnaaw's senses:

noun	- back (body part)
preposition	- behind (extended uses: after, except)
subordinating conjunction	- since (causal not temporal)

- (1) *Jigéénu Senegaal dañuy boot seen doom ci GINNAAW*
woman+conn. Senegal EmphVb.3pl+imperf carry their children prep. *ginnaaw*
Senegalese women carry their children on their BACKS

(2) *Mi ngi dëkk ci GINNAAW jàkka ji*

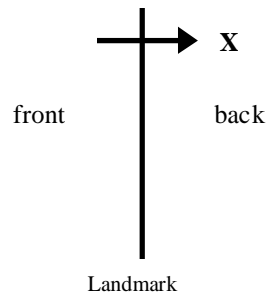
3sg...Presentative live prep. *ginnaaw* mosque the
He lives BEHIND the mosque

(3) *GINNAAW faral nga ko, maa ngi dem.*

ginnaaw to-side-with Perfect.2sg him, 1sg...Presentative go
SINCE you have taken his side, I am leaving

Thus, we are dealing with the well-known phenomenon of grammaticalization. However, since we have here a morpheme which has three functions in the synchronic system, rather than a historical process, I prefer to use the term *transcategorical morpheme*. By 'transcategorical', I am focusing on the fact that *ginnaaw* functions in different syntactic categories. *Ginnaaw*'s polysemy then involves syntax, semantics and also argumentation. This synchronic functioning requires a semantic analysis which can both provide a unitary analysis of the meaning, and also account for the various senses of the morpheme.

The analysis presented here assumes that *ginnaaw* defines an asymmetrical space with a front / back orientation proceeding from a LANDMARK (or LOCATOR) and REFERS TO THE SPACE BEHIND IT (excluding the landmark). 'Landmark' can be understood in Langacker's sense (1987:10) with the additional qualificationⁱⁱⁱ made by Culioli in his use of *repère* (1978a, 1978b), often translated as 'locator'. A locator refers to any kind of entity (a notional or a temporal reference point, a physical landmark, a noun, a proposition, a speaker...), used in an utterance as a reference point to locate (and thus specify) another entity. For the purpose of this paper, 'landmark' and 'locator' are essentially equivalent.



ginnaaw

Diagram 1

With this definition, the different uses of *ginnaaw* can then be explained according to which element serves as the landmark. This element plays the role of the variable producing the observed polysemy. The syntactic scope of each different usage reveals the different levels in the sentence at which *ginnaaw* applies. In the various uses of *ginnaaw*, the same semantic structure applies at

different syntactic levels. This property is what makes the functioning of a morpheme, a 'fractal' functioning. Thus *ginnaaw* refers to different 'domains' which are presented as structured spaces with their specific landmarks: body, spatial relations and discourse. I'll try to show, as well, that this semantic analysis can also account for the argumentative values of *ginnaaw* and its pragmatic effects.

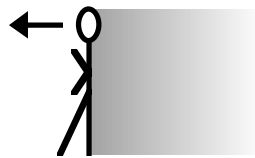
1. *Ginnaaw* as a noun and as a preposition. In its first use, *ginnaaw* functions as a noun. It can be used after a preposition, as shown in example (4), or take a possessive determiner, as shown in examples (5) and (6).

(4) *Jigéenu Senegaal dañuy boot seen doom ci GINNAAW*
 woman+conn. Senegal EmphVb.3pl+imperf carry their children prep. *ginnaaw*
 Senegalese women carry their children on their BACKS.

(5) *Xoolal GINNAAWam*
 look+imper.2sg back+his
 Look at his BACK / look behind him (ambiguous)

(6) *Xoolal ci sa GINNAAW*
 look+imper.2sg prep. your back
 Look in/to your BACK = the space behind you

Notice that syntactically, there is no noun after *ginnaaw*: *ginnaaw* has a nominal status (it receives the nominal determiners), thus a referential scope and a denotational value. Since there is no other element in the clause to play the part of the landmark, *ginnaaw* refers to the space behind the primary landmark, namely the human body. Example (5) and (6) show that the space referred to is not only the body part 'back' but can be extended to the space associated with the body part, the space behind the person. It is worth noting that the human body has an intrinsic orientation and this orientation is relevant to *ginnaaw*; as depicted below.



By way of contrast, in example (7), *ginnaaw* governs a noun, *jàkka ji* - 'the mosque', in which case it behaves like a preposition with its syntactic scope and specific semantics. It introduces an argument and does not refer to the body part any more. The noun plays the role of the landmark and *ginnaaw* refers to the space behind this landmark.

- (7) *Moodu, mi ngi dëkk ci GINNAAW jàkka ji*
 Moodu 3sg...Presentative live prep. *ginnaaw* mosque the
 Moodu lives BEHIND the mosque

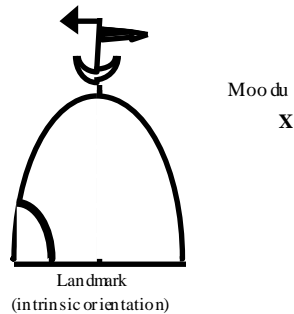


Diagram 2

Ginnaaw is used to locate an argument of the clause (namely 'Moodu', the subject) behind the landmark specified by the complement ('the mosque'). The use of body parts as spatial prepositions is very common crosslinguistically^{iv}. Wolof has an entire system of body parts used in compound prepositions, as shown below. The compound prepositions are prepositional phrases made up of the only real preposition of Wolof (the locative *ci*), the body part noun and the connective suffix [u]^v.

<i>kanam</i>	face	<i>ci kanamu X</i>	in front of X
<i>biir</i>	belly	<i>ci biiru X</i>	inside X
<i>wet</i>	side	<i>ci wetu X</i>	beside X
<i>ginnaaw</i>	back	<i>ci ginnaaw(u) X</i>	behind X
<i>ndigg</i>	waist	<i>ci diggante X ak Y</i>	between X and Y

As mentioned previously, *ginnaaw* only refers to a space behind a landmark. Thus, as a spatial preposition, it requires a locator (namely the Wolof locator *ci*) to relate the two arguments (the one located, i.e. the subject, and the one specifying the landmark of the space, i.e. the circumstantial complement) in the predicative relation. This constitutes a syntactic constraint related to the semantics of *ginnaaw*. *Ginnaaw* is then used in a complex prepositional phrase. By way of contrast, in its temporal uses^{vi}, as in *ginnaaw ëllëg* - '(the day) after tomorrow', and its argumentative uses (see section 3), *ginnaaw* is related directly to the main verb (without *ci*) because it is not used to localize one argument in the space defined by another argument. Rather, it defines the 'space' in which the PREDICATE is validated, specified by the landmark.

In the case we have just examined, the landmark -- namely, the mosque -- had an intrinsic orientation. What happens in such a case when a landmark, such as a hill, has no intrinsic orientation?

- (9) *Moodu, mi ngi dëkk ci ginnaaw tund bi*
 Moodu 3sg...Presentative live prep. *ginnaaw* hill the
 Moodu lives behind the hill.

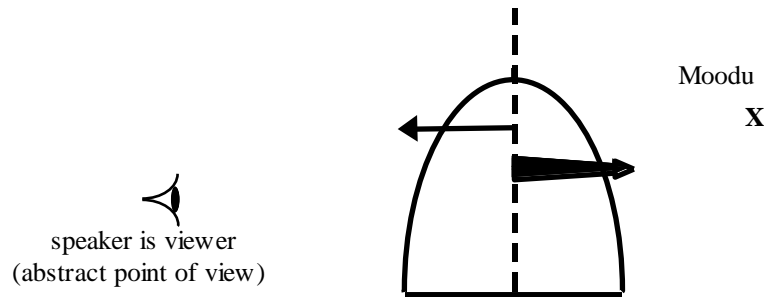


Diagram 3

The orientation is then given by the point of view of the speaker. The speaker is a viewer^{vii} and creates the orientation of the landmark as FACING him.

2. GINNAAW as a subordinating conjunction. Now, let us turn to the third use of *ginnaaw* as the subordinating conjunction 'since' in its causal sense.

- (10) *GINNAAW faral nga ko, maa ngi dem.*
ginnaaw to-side-with Perfect.2sg him, 1sg...Presentative go
 SINCE you have taken his side, I am leaving.
- (11) *GINNAAW añ nañu ba noppi, mën nañu naan ataaya*
ginnaaw have-lunch Perfect.1pl until cease, can Perfect.1pl drink tea
 SINCE we have finished lunch, (now) we can drink tea.

Here *ginnaaw* is used in a complex sentence and governs the subordinate clause, designated P in Diagram 4. The subordinate clause always precedes the main clause, designated Q. According to the general analysis proposed in Diagram (1), *ginnaaw* refers to the space behind a landmark. Here, however, the landmark is the clause P, in which case *ginnaaw* expresses a locational relationship between two clauses. 'Behind (i.e. given) the fact that you have taken his side (P), there is the fact that I'm leaving (Q)'.



(*ginnaaw* refers to the shaded space)

Diagram 4

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, i.e. a complex assertion. According to *ginnaaw*'s semantics, the clause P ('you have taken his side') is the landmark behind which the clause Q 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, a topic.

This point is confirmed by the syntactic constraints on the order of the clauses. As shown in examples (12a) and (12b), *ginnaaw*-clauses always appear first. Wolof word order does not parallel English word order in this type of sentence. The *ginnaaw*-clause can occur after the main clause only when the sentence is marked by a special cohesive anaphoric intonation which confirms its topical status. In contrast with another causal morpheme *ndax*, *ginnaaw* always appears in first position (compare examples 12 and 13).

- (12) a. *GINNAAW mënuloo ànd ak man, maa ngi la fiy bàyyi.*
ginnaaw can+Neg.2sg accompany with me, 1sg...Presentative you here+uncompl. leave
 SINCE you can't come with me, I am leaving you here

- (12) b. **maa ngi la fiy bàyyi, GINNAAW mënuloo ànd ak man*
 I am leaving you here, SINCE you can't come with me

- (13) *Maa ngi la fiy bàyyi, NDAX mënuloo ànd ak man.*
 1sg...Presentat. you here+uncompl. leave, because can+Neg.2sg accompany with me
 I am leaving you behind BECAUSE you can't come

The topical status of the *ginnaaw*-clause is also confirmed by the impossibility of an answer with *ginnaaw* to the question 'why are you leaving?'. As shown in (14), the normal answer to a why-question, is with *ndax*. An answer that begins with *ginnaaw* is understood to be an unfinished sentence (cf. 14c and d).

(14) *Lu tax ngay dem ?*

What to-cause Aorist.2sg+uncompl. go

Why are you leaving ?

(14) a. *NDAX mënuloo ànd ak man.*

Because you can't come with me.

(14) b. **GINNAAW mënuloo ànd ak man*

Since you can't come with me

(14) c. *GINNAAW mënuloo ànd ak man, KAY...*

Since you can't come with me, THEN...

(14) d. *GINNAAW mënuloo ànd ak man, MAA NGI LA FIY BÀYYI.*

Since you can't come with me, I'LL GO BY MYSELF

Thus, the two markers express causality but with an opposite 'figure / ground' organization (Talmy 1978) at the discourse level. The *ginnaaw*-clause is not new information (figure); it is only the topic (ground) i.e. the starting point or reference point of the utterance.

Thus, in its interclausal use, *ginnaaw* does not express a temporal sequencing of the events P and Q in spatial terms (*behind = after P, there is Q). Rather, it expresses a relationship between two propositions in the *assertive space*, namely a localizing relation between a topic and a focus. This is confirmed by the fact that *ginnaaw* in its subordinating uses apparently never has the temporal meaning of 'after'^{viii}. Moreover, as shown in example (15), where the subordinate clause refers to a future event, *ginnaaw* does not imply temporal antecedence of the first proposition vis-à-vis the second.

(15) *Ginnaaw mu ngi fay dem, jarul may bind*

ginnaaw 3sg...Presentativ. there+uncompl. go, worth+Neg.Perf.3sg Aor.1sg+uncomp. write

Since he is going there, there is no need for me to write

Here, the causality is presented as a spatial orientation between two propositions, the first one being the topic after which the second one can be asserted. The preceding statement ('he is going there') has created a spatial situation orienting toward a conclusion ('there is no need for me to write'), following 'behind' those premises. The consequences 'following' *ginnaaw* are not temporal, but argumentative. In example (15), the event referred to by the *ginnaaw*-clause is still to come at the time of utterance but the speaker infers from this first statement consequences for the present situation.

Thus, at the utterance level, *ginnaaw* validates the main clause as a following consequence of the topic. The spatial relationship between the two clauses expresses both a sequencing in CAUSALITY and a sequencing IN THE SPEECH ACT. Two crucial points are involved here:

(a) Causality is conceived as a localization in a space comparable to the model of space built up from the orientation of the body, where the

landmark-clause is the causal source ('causal landmark') behind which there is a following event.

(b) Argumentative inference is conceived of as an orientation in the 'assertive space'. The topic, or given information, is the starting point of the utterance^{ix}. It is the 'discursive landmark' from which the speaker's stance follows. The focus follows the topic as a consequence in the 'assertive space'.

The specificity of this causality appears in the contrast between *ndax* and *ginnaaw*. *Ndax* expresses an explanation, the causal clause is the focus. By contrast, the *ginnaaw*-clause expresses the discursive landmark, from which the speaker's stance follows ('since you can't come with me, then I leave you here'). For this phenomenon, I use the term ARGUMENTATIVE CAUSALITY.

<i>ndax</i>	because	<ul style="list-style-type: none"> - causal clause is the FOCUS ('figure'), speaker's assertion. - explanation
<i>ginnaaw</i>	since	<ul style="list-style-type: none"> - causal clause is the TOPIC ('ground'), hearer's assertion^x. - causal clause is the LANDMARK OF ASSERTION - argumentative causality ('I'm not responsible'): comment 'follows' from the topic

3. Discourse as a landscape: topology of argumentation. With *ginnaaw*, discourse is presented as a landscape where some propositions are landmarks defining spatial ordering, orientations and paths between propositions. Argumentative inference is conceived as a path leading from one statement to another. Actually, in order to describe the clause Q as located in a space behind P, you need a viewpoint. Since we are at the utterance level, we can assume that the speaker is the viewer of this landscape -- a conceptualizer with a point of view, vantage point and orientation in the abstract space of discourse. A schematic representation of the speaker's point of view is given in Diagram 5.

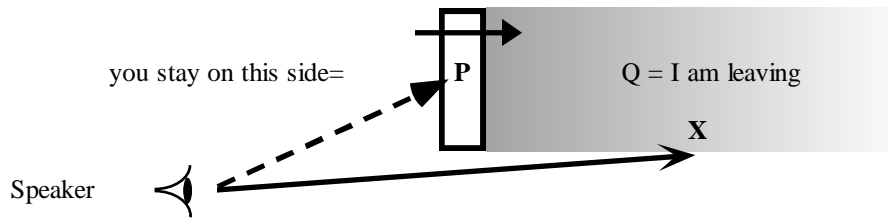


Diagram 5

The use of *ginnaaw*^{xi} in the sense of 'besides', 'except', confirms this analysis of assertion in terms of abstract spaces and abstract point of view, as shown in example (18).

- (18) *GINNAAW Moodu, ñépp ñëw nañu*
ginnaaw Moodu, all come Perf.3pl
 BESIDES (except) Moodu, they all came.

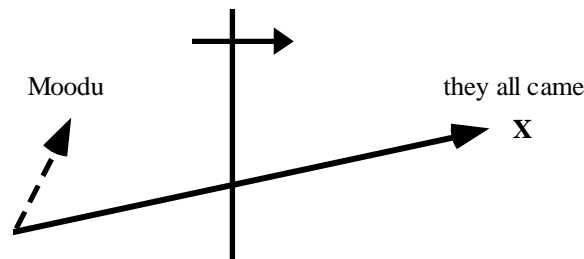


Diagram 6

According to the general analysis, *ginnaaw* creates an asymmetrical space and REFERS to (thus validates) the 'space' behind the landmark, excluding the landmark. In other words, the proposition 'they all came' IS TRUE only behind the landmark 'Moodu'. Hence the sense 'except Moodu, they all came'.

In this spatial framing of the discourse, when *ginnaaw* relates two clauses, argumentation is laid out in such a way that from the point of view of the conceptualizer, the comment is considered as proceeding from the topic. In order to be a topic, i.e. a DISCURSIVE LANDMARK, the *ginnaaw*-clause has to be a stable reference point, therefore a clause presented as EPISTEMICALLY GROUNDED so that the speaker can use it as a starting point for AN ARGUMENTATIVE SEQUENCE. Thus, with *ginnaaw*, the causal clause is presented by the speaker as part of the common ground of the discourse, a previous statement, independently established (whether discursively true or not) and independent of the current speech act. The current assertion Q follows from the orientation created by the previous one P, therefore the speaker is not responsible for the consequences following this first statement. The various argumentative effects proceed from this epistemic status of the *ginnaaw*-clause.

Speaker and addressee may have different positions with respect to the focus of the *ginnaaw*-utterance. If the addressee has the same position as the speaker with respect to Q, as in example (11) where Q is good or neutral, the argumentative effect is a confirmation. If the addressee has a different position with respect to Q, as in example (10) where Q is bad, the argumentative effect is what I have called the 'return to sender' effect (Robert 1990). That effect says if you are not happy with this, go back to the person that created the first situation ('you have sided with him'), from which my assertion is only a consequence ('I am leaving').

Here we have two metaphors, in Lakoff's sense (1993:207). Causality is conceptualized in spatial terms, one event behind another. In addition, with *ginnaaw* another metaphor is also at work which we can call the metaphor of discourse as landscape -- i.e. the structural properties of space (source domain) are mapped onto discourse (target domain). Argumentative sequences are constructed in terms of spatial relations (localization, orientation and paths proceeding from landmarks) between propositions. One statement is located behind another thanks to the orientation created by the discursive landmarks. In other words, discourse is framed as what I call 'an assertive space'. In that space, topics and comments follow each other, creating argumentative inferences. This spatialization of discourse also occurs in argumentative morphemes of other languages, as shown below, with English *way* and French *ailleurs*.

Engl. *anyway*

Fr. *par ailleurs* (lit. 'through elsewhere') = Engl. *besides, moreover*

Fr. *d'ailleurs* (lit. 'from elsewhere'). = Engl. *on the other hand*

4. Grammaticalization as a fractal property of language. Through the various uses of *ginnaaw*, we see the same image-schematic structure functioning at different levels inside the utterance, as given in Diagram 7. The context specifies the level at which this semantic structure functions by defining the syntactic scope of the item and the nature of the landmark. When *ginnaaw* is in nominal function, no other term in the utterance plays the role of the landmark; the morpheme has an extra-linguistic reference; the landmark is the primary landmark -- i.e. the human body. In prepositional use, the landmark is the noun governed by *ginnaaw*. In subordinating use, the landmark is the clause introduced by *ginnaaw*.

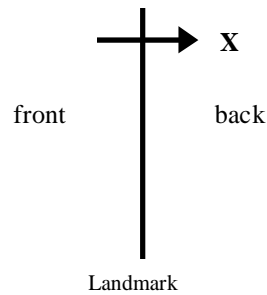


Diagram 7

Landmark = \emptyset = the body	<i>ginnaaw</i> = noun	sense = 'the back'
Landmark = a noun	<i>ginnaaw</i> = preposition	sense = 'behind'
Landmark = a clause	<i>ginnaaw</i> = sub. conj.	sense = 'since'

Grammaticalization and, more generally, the transcategorial functioning of morphemes such as *ginnaaw*, reveal a FRACTAL property of language. Indeed, objects are said to be 'fractals' (Mandelbrot 1975) when they have the property of SCALE INVARIANCE and SELF-SIMILARITY (Sapoval, 1997:73, 136): a similar structure appears at different scales. Those objects are invariant when undergoing a dilatation. A coast for instance is a fractal object (see Gleick, 1991:128).

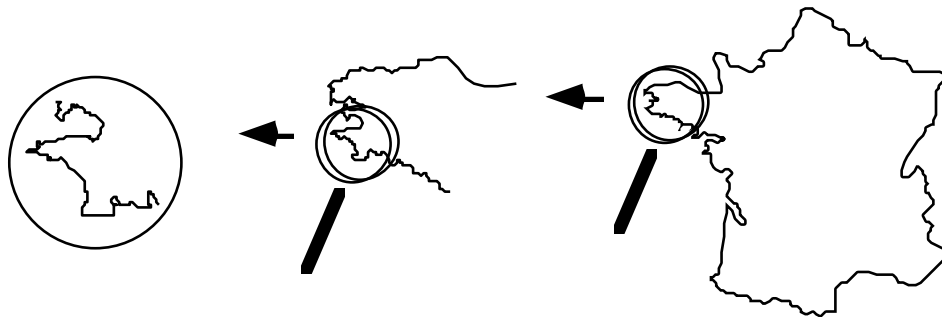


Diagram 8

Thus, fractals have SCALING LAWS (Sapoval 97) by which a common structure appears at different scales. But each scale also has specific scale properties so that there is no strict identity between the same structure appearing at different levels. Rather, we have an 'analogic' structure.

In the same way, we can say that with *ginnaaw* a similar semantic structure applies at different 'scales' inside the utterance. The linguistic 'scale' is the syntactic 'level' at which the unit functions. In language, the different syntactic levels are embedded in each other -- nominal level, prepositional phrase level, clausal linkage and discourse level. Through its transcategorial functioning, the

semantics of *ginnaaw* undergoes dilatation of its syntactic scope with scale invariance and scale properties.

Attributing SCALE PROPERTIES to *ginnaaw* means that each level of the utterance (defined by the syntactic scope of *ginnaaw*) has specific properties despite a common semantic structure. Those properties are defined by the syntax and create the polysemy. At the nominal level, *ginnaaw* has referential scope and a denotational value. At the prepositional phrase's level, *ginnaaw* builds a relation between two arguments. At the utterance's level, we have the point of view of the speaker who endorses the utterance; a topic and a focus; a framing of the clauses with topological relationships. At this level, we also have argumentative effects produced by the topical status of the landmark organizing the framing of one proposition by another. The different paradigmatic oppositions of the various senses also appear as scale properties that specify the semantics of the term in each of its various uses. These are summarized in the chart below.

Scale properties of <i>ginnaaw</i> (with specific paradigmatic oppositions at each scale)	
• nominal scale:	- referential scope and denotational value
• prepositional scale:	- relation between two arguments
• utterance's scale:	- speaker's point of view and assertion
	- topic and focus
	- framing of the clauses (topological relationships)
	- argumentative effects

Thus, the analysis of grammaticalization in terms of a topologically structured image schema, abstracted and preserved from one domain to another (Sweetser 1988), allows an account of the SEMANTIC INVARIANCE of a transcategorial morpheme and motivates the grammaticalization. Moreover, the fractal model proposed here specifies the nature of the various DOMAINS involved in transcategorial marker uses and accounts for the gain and loss of the meaning in the different uses by relating the SEMANTIC VARIATION to the change of syntactic scope in a functional manner.

Conclusion. The morpheme *ginnaaw* reveals connections between body, space, causality and argumentation. These different domains have common topological properties which allow the same term to refer to all of them. With *ginnaaw*, causality (argumentative causality) is conceptualized as a localization in a time-space comparable to the model of space built up from the orientation of the body. The foregoing space corresponds to the causal antecedence and the previous statement corresponds to the source of discursive inference. Argumentation thus appears to be also describable as an orientation in the assertive space. The analysis of grammaticalization in terms of fractal functioning relates syntax,

semantics and argumentation in the dynamic process by which the meaning of a term is constructed inside an utterance.

ⁱ I am grateful to Kevin Moore and Miriam Petruck for their helpful comments on this paper.

ⁱⁱ The official orthography of Senegal is used here.

ⁱⁱⁱ In Culioli's conception, the referential value of a word and the meaning of an utterance are not given but yielded by a series of 'locating' operations at work inside the utterance: by relating a located term to an anchoring point (the 'locator'), the locating operation produces a new specification for this located term. This basic operation applies at different levels: the notional level (lexicon); the predicative level; the higher level of the speech act. At the predicative level, a predicative relationship is constructed. At the level of speech act, the predicative relationship is associated with a speaker and a time-place, and also with a previous verbal context defining the topic.

^{iv} Locative noun phrases with an animate in genitive function (*ci ginnaaw Faatu* lit. "on Faatu's back") are ambiguous, referring either to the body part ("on Faatu's back") or to the space behind the landmark ("behind Faatu"). They represent an intermediate stage leading from nominal status (body part) to the use in a prepositional phrase with inanimate complement (*ci ginnaaw jàkka ji* "behind the mosque"), in which case the syntactic properties of *ginnaaw* are different and the reference to the body part is absent.

^v The suffix [u] appears throughout the whole paradigm of these compound prepositions. The apparent exception in the case of *ci ginnaaw X* might be explained by phonetic reasons -- i.e. assimilation between the suffix [u] and the final bilabial glide [w].

^{vi} The temporal sense of *ginnaaw* is possible in its prepositional use but non central. In that case, the temporal domain is shaped as a space. This temporal use however seems to be impossible when *ginnaaw* is used as a subordinating conjunction (see section 2.).

^{vii} In the sense of an abstract point of view, since the speaker, who still functions as a reference point with its spatial orientation, might actually not see the hill.

^{viii} "After" is expressed with another morpheme (*bi/ba*): *Bi mu lekkee la dem* (when Aor.3sg eat+anterior. EmphComp+3sg go) 'After he had eaten, he left'.

^{ix} The 'constitutive locator' in Culioli's terms (1990 : 138-9).

^x Or a previous speaker's assertion. See section 3.

^{xi} Thanks to Kevin Moore for calling my attention to this use.

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