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The Biolinguistic Instantiation: Form to Meaning in Brain/Syllable Interactions

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Abstract

We propose, in this chapter, a language model anchored in the relation between immanence and manifestation based on points of view. Within this realm, the *biolinguistic instantiation* implies both biosemiotic Interpretability and evolutionary symbolism. Furthermore, being one of the five points of views (representation, analysis, catalysis, instantiation, and formantization), it is the principled topology of the thematic/schematic relation between structure and world. We exemplify in this case, the empirical background of syllables and consonant clusters (phonesthemes). From our findings, we seek hypothetically to investigate the instantiation of dual stream dynamics (dorsal/ventral) as the projection (internal structure) of symbolic rules we have observed on the external structure: mirror/deletion and buckling models of onset/codas, on the one hand, and agentive features such as [+/− source], on the other hand; these rules are supposed to form lexicon's storage and computation. Our heuristic basis will be the relevance of the mirror neuron system for both dual stream model (HicKok/Poeppel) and frame/content theory (McNeilage). Emphasis will be put on universal/typological implications of instantiation in Berber and English.

Keywords: biolinguistic instantiation, points of view, form iconicity, MNS, dual stream model, internal/external language structure

1. Introduction

The recent project of unifying biolinguistics and theory of language expresses the endeavor to both understanding how evolution has led to internalized structures bearing pronounceable/comprehended forms and how these forms are not mere projections but precisely innate acquisition models encountering performance and intentionality. Therefore, *represented representation* within a much larger semiotic principle predisposes the way language is instantiated on output forms based on the *event structure*. Henceforth, we consider the internalization of a dynamic ontological principle as correlated to bio-physiological-cognitive and social structures unifying the framework of explaining iconicity-motivation (within the linguistic strict distinction of form and meaning) and the semiotic function between expression and content levels of the semiotics-object. Moreover, empirical verifiability is increasingly reshaping our consideration of relevant levels on the linguistic structure.

The study of language is then orientating us toward a new scientificity within both verifiability and structure interfacing (internal/external): this new episteme includes the consequence of redefining not only the object of language but also its relations to its supplements, to evolution and brain impairments. Thus, the tensions arising between the real object and its analytical components, more specifically the discrepancies between bidirectional representation and analytical geometries, imply a new consideration of the linguistic event, its hierarchies and the instantiation. We will in the following chapter present our results stemming from both empirical data and theoretical development on both linguistic and semiotic inquiries of the relation between form—meaning and consciousness.

1.1 A signifying gestalt: the biolinguistic instantiation as one point of view/the neurophysiologic point of view

In the horizon of the structuralist turn, analysis has been an important consequence of an intuition rethinking another domain: the consequence of hypothetic-deductive methodology on the definition of the *real object* grounding in the methodological object. First, the consequence of both representational phonology meeting the isolation of psycholinguistic empirical tokens but also inscribing language in a potential acquisition actant suggesting since the generativist turn that immanence is also a result of a biolinguistic instance [1] whose analytical component is both universal and competence/performance derivability. On the other hand, the semiotic principle, epistemologically, split up—so to speak—in paradigmatic/syntagmatic axes of analysis contributes by a new turn to emphasize the double static/dynamic structure of signification/meaning and the semiotic specificity of being a represented representation.

Beyond reflexivity principle or the consciousness basis of the semiotic principle—its object language—and beyond metalinguistic operations [2, 3], we owe this specificity to the observer/gestalt structure where schematization implies the predisposition/disposition of both mediation—interpretability. Henceforth, triggered by the semiotic principle (SP, semiotic function and semiotic stratification hierarchy), the points of view are the observer/epistemic link between real and structural object within the relation between immanence and manifestation. This link is not a faithful relation, it is defined by optimality rules, visibility/invisibility, ordering and inversion, markedness and co-selection.

1.2 The parallax[1] of language gestalt: defining the theoretical framework of points of *view*

We postulate in the following insight a framework of analysis/catalysis, representation, formantization and instantiation.

1.2.1 The structural point of view: analysis/catalysis

We define the structural points of view of analysis/catalysis as the following: first, the condition of articulation to refer to its own immanent event of distinctiveness/significativeness deriving its levels from form selection, value as being extracted and abstracted from the continuum in virtue of certain rules defined by the structural network of functions. Analysis is the *human* computational faculty of

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[1] Ref. [4].

structuring language referring to its immanent laws. Secondly, catalysis considered within the distinction between the empirical process and the theoretical system is the analytical component of the syntagmatic chain supposing both the deepest level of taxemes (deeper than class and feature) and a surface (in praesentia), underlying scheme (in absaentia) in a double constitution of the linguistic text. Hence, the structural point of view is the differential gap between analysis and catalysis on manifestation level.

1.2.2 The point of view of representation

Representation within the gap between perception (analysis) and apperception [5], articulation/production but also the gap between recursivity [6] and reflexivity (meta-linguistic, etc.) is the cognitive (also memory-based) and recognition condition of language faculty oriented by an internal interpretability principle that mediates the relation between hierarchical levels and merge operations of input-output dynamic. Both conceptual-semantic and phonological-phonetic (acoustic) representations interact grounding in the "need" to open computational modules by cognitive ones (acquisition for instance).

1.2.3 The point of view of formantization

The perspective of the use as a level of manifestation has not been entirely embedded in the realm of language sciences, Hjelmslev formants have been sporadically defined as the material expression of morphemes (content level). Let us assume that some purposes related to this issue have been split between concrete and non-distinctive but obligatory features [7, 8] who attributed the first to the norm and the latter to the use. Furthermore, more recent accounts are divided between a new acquisitional constructivism, a non-generativist theory of acquisition [9–11] and sociolinguistic theories such as cognitive sociolinguistics. Greimas and Courtes [12] consider formants as figures of the expression chain corresponding to a unit of content level which enable it to be full sign (lexical morpheme or word), the latter within semiosis. Moreover, Chomsky's formatives [13] are minimal syntactic units that could be derived into lexical and grammatical morphemes represent on the surface level the realization of a specific performance that obey strict phonological rules mapped on the phonetic string (deleting/inserting) [14].

It is the distinction between lexicon (conceptual component) and the computational component that emphasizes formative output rules as extrinsic ordering depending on merge operations binding both components. Henceforth, formation rules including emptiness/invisibility rules but also extrinsic ordering and adjustment rules imply the mapping of lexicon on the surface and the mapping of this latter on the use. Free selection (sometimes called monemes by Martinet) has the following implications for our consideration:

- First, the articulation of frame/content theory in its evolutionist account for the syllable emerging from organic gestures (we will later ground in an articulatory phonological approach) [15–17] enables to think out the segmental content within a precedence of the gestural syllable as put by McNeilage [17], a hierarchical level grounding in facial/Jaw and mandible gestures acting as premotor gesture, pointing the possibility of their sub-segmental aspect (articulatory phonology considers indeed the difference between gestural and featural levels as the basis of segment analysis) [18].

- Secondly, the overlap and competition between gestures plays in both approaches the role of a lexical device of distinctiveness in the representation. Beyond the debate between C/F theory and articulatory phonology, the precedence of the gestures implies the role of content or the segment as less deeper unit in the representation than gestures/syllable frame. From another perspective, namely the forming form (forma formans), formantization belong to the mapping of the enunciative-predicative meta-linguistic operations on the syntagmatic chain.

1.2.4 The point of view of instantiation

We refer herein to a distinction between analysis/structure and instantiation where the immanent/computational structure referring to its own abstraction/ articulation levels is schematic/system-based and instantiation is its counterpart, a formal system dynamics inscribing the world in the structure. Stated in these terms, instantiation is the condition of the double significance (Benveniste's semantic and semiotic significances) which would mean: first, syntactic determination (syntagmatic rules) and enunciative-predicative world/situation regulation. Secondly, systems enabling the formal presentification of the structure (social, biological, physical, etc.). On the other hand, beyond ontological-praxeological constitution of any signification [19] instantiation is not an active use of the structure oriented by pragmatic-communicative intention or causality but rather a mediation between a manifestation level and its state of the world [20] understood in a non-referentialist, non-causal perspective. It is the dynamic interpretable object of a semiotic utterance principle determined by both representation and regulation. In our morpho-dynamic approach, this mediation relates the continuous and the discontinuous as a *forming form* linking intentionality/bios and/or the unconscious to the structure. We assume that the presence of the structure does not depend on itself as for analysis/catalysis (derivation/deduction) but on these specific elements:

- Instance: level of the formal presence of language under the form of a dynamic act.

- Instantiators: situational/positional taxemes, articulators/gestural principles, brain connections, drives … are active elements of the signifying process.

Henceforth, we will refer to the biolinguistic instantiation as the bio-physiological *symbolic* and *formal* dispositive in both its extra/intra-structural presence based on a hypothesis of schematization (predisposition/disposition).

2. The biolinguistic hypotheses of world/structure instantiation: phonesthemes and syllables (from perspective into perspective)

The following framework presents the results of an ongoing research that will appear in a book on this subject. The experiment consisted in the participation of 20 French EFL (English as a Foreign Language) and Berber language students (Kabyle Students taking Tachelhit language course at the INALCO/Paris) who have answered both an acquisition questionnaire and a multiple test including: a recognition test in three components (cognates, speech errors and co-selection couples), a narrative test (consonant clusters and semantic frames) and an acoustic test.

Grounding in the former background, we would like to present our hypotheses based on the frame of syllable iconicity and phonesthemes as world/structure schemes, distinguishing it from motivation being the praxeme of the world within

the structure. Put in its semiotic frame, more precisely the frame of asymptotic semiosis (peircian iconicity) [21], prosodic [22] and linguistic iconicity [23, 24], though metaphorized by the firstness mode are nonetheless not overlapping the Peircian sense, that is to say the positivity of the presence in virtue of a certain first impression of world/perception analogy. Hence, Jakobsonian iconicity refers to the form miming form, or the form miming the meaning (exophoric vs endophoric terms of W.Nöth). linguistic iconicity relates doubly to other concepts and apprehension modes given the fact that the link between language (as a semiotic principle) and natural languages but also the link between natural languages and their proper actualization is not saturated, not entirely covering iconicity knowing that it relates variably to world references (virtual or actual ones) and to uttering/use relating to the orientation/schematization of the structure.

2.1 The gestural/neuronal mapping and schematization of the syllable

2.1.1 The gestural/articulatory postulate

Based on the theoretical frame of both gestural/articulatory phonologies [25, 26], we consider that the syllable relies on both a gestural frame, discrete oppositions analyzed under schematic scores of natural classes upon which segmental content is realized. On the other hand, lexical access draws on gestural frames for the representation of distinctiveness suggesting dynamic parameters of articulatory events that could be relevant for typological selections (formants and possible specific contrasts) from the point of view of the target/pointing schemes of the tongue.

Evidence from acquisition but also neurobiological evidence (McNeilage) will be addressed in the following purpose. On the other hand, the fairly evidence of *C-center Effect* [27] of consonant initial phasing with the vowel and their counter coda (anti-phasing, intra-clustering and only postvocalic phasing of the first consonant) shows a clear gestural organization of syllable patterns producing the phonotactic structure but more widely suggesting that the computation of this phasing is to be found in both neural mirroring effect and dual stream models of speech processing.

2.1.2 The neuronal postulate

The discovery of Mirror neurons in Monkeys (F5 premotor and parietal area) by Rizzolati and Arbib [28] has led to the discovery of a system (MNS) or mirror regions supporting imitation and mapping of action onto cognition, important consequences on both motor/gestural systems have been found. Moreover, evidence stemming from pathological impairment perspective based on theoretical/epistemological considerations is to be emphasized. To refer to some of the major contributions in this field, we can consider the following list: [29–37].

Beyond the good links between the MNS and current biolinguistic theories,[2] we would like to evoke two aspects relying on the distinction between *neural scheme* (signified) and the MNS (the signifier). Moreover, MNS hypothesis is the epistemological result of Arbib's Schema theory [38], it grounds neurocognition in a symbolic schematism of a sensory-motor component (or perceptual/active models). The model suggested by Arbib et al. may introduce the schematic basis embedded in its brain circuitry. Instantiation, likewise merge operations of the minimalist program [39] in its biolinguistic component, is a combination/assemblage of instances

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[2] We should nonetheless notice some criticism coming from one of the two founding scientists of dual stream model of speech, namely Hicock, in the *Myth of Mirror Neurons: the Real Neuroscience of Communication and cognition*).

that map the Mirror Neurons onto the Mirror system. We reproduce herein Arbib's model [40]:
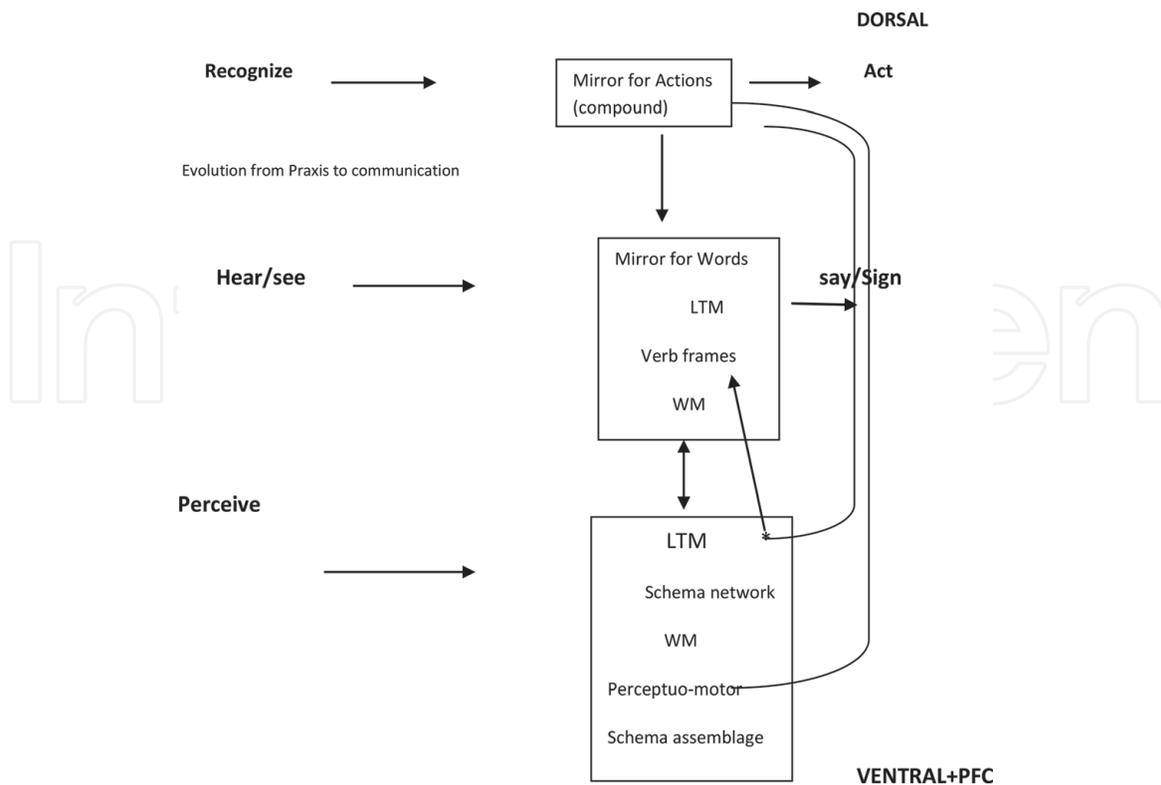
On the other hand, conceiving a grammar as the one called construction grammar by the model to address semantic operations of action and the mirroring implies for us, or better said for the model I seek to anchor in biolinguistics, the distinction between phonological/prosodic processes (analysis) of the syllable as being its proper form/structure (iconicity) and the semantic schematization (motivation) of structure-to-meaning predisposition. We face, in this case, two hypothetical processes:

2.1.3 Structure imitating structure

It exists separately from acquisition and its MNS (mirror neuron system) thanks both gestural/computational and taxemic orientation of the syllables (class/inventory relations) embodying the potential catalysis and content placement in formantization. Thus, based on a neurocognitive model of an internal syllabary [41], we would like to term the bio-syllable that map the mirror system on both sequencing/phasing representations and their semantic instructions for both lexicon and syntax. In this case, the bio-syllable in the brain is the instantiation of the underlying scheme by mirror neurons enabling the semantic structure to imitate the phonological/prosodic structure.

Furthermore, the mirror model for the syllable suggests not only gestural/segment representation and lexical-semantic schematization but rather a gestural lexicon model of mirroring we will exemplify later on within English onset-coda clusters (/spl/, /zl/) or reduplication patterns in Berber, for instance ($c_a c_b v_1 c'_b v_1$).

2.1.3.1 An acquisition/recognition model

The interaction between analysis/catalysis and recognition is based on the interactions of Working Memory/Long term Memory. It enables us to think out both acquisition/recognition models as an interaction between computational and conceptual/cognitive components. Input/output relations rely on imitation models partly discussed by Billard and Arbib [42] that require a schematic assemblage (in our case, a

conceptual syllabary as posited by Brendel et al. [43] and the imitation component (motor, concept representation) [44]. Moreover, Vihman [45] argues that the acquisition of babbling patterns relies on an articulatory filter matching prosodic exponense/acoustic signal to segmental organization. The involvement of motor imitation based on mirror system provides the empirical/theoretical framework.

The Mental Syllabary Model in its form is related to psycholinguistic lexical access; it argues that speakers have access to high frequency syllables through a mental syllabic/lexical model that triggers motor representation. High/low frequency syllables (or the syllable frequency effect) are studied from the perspective of word-final syllable sensitiveness in the mental lexicon in respect to Naming Latency and its processing time.

We postulate that the interaction of catalysis/analysis, processing/recognition shaping the acquisition draws on mirror neurons which enables mental syllable mapping on perpectuo-motor/semantic sensitive frames of the lexicon.

2.2 Dual stream model: connections and networks

To provide a brief definition of Hicock and Poeppel's Dual Stream Model of Speech [46–50], we will sum it up in the following: it is a model that seeks a neuro-functional anatomy of language based on the understanding of partly overlapping, partly distinct neural circuits: speech (perception) is believed to lie primarily [49] on neural circuits, bilaterally in the superior/temporal lobes whereas speech production relies on a fronto-parietal/temporal circuits (left hemisphere dominant). First designed to understand vision (ventral recognition/dorsal sensory-motor integration), it has become a model embedded in both normal/pathological understanding of the dorsal stream as responsible of phonological/prosodic translation of speech signals into articulatory representation in the frontal lobe, whereas the ventral stream (superior and middle portions of the temporal lobe) processes speech signals for comprehension (speech recognition).

A sub-hypothesis will help us work out the concept of biolinguistic instantiation within the bio-syllable frame:

- Categorial recognition/processing:

Evidence has been shown by the model (2007, 2012) that parts of the STS are important for representing phonological information during word processing: psycholinguistic variables such as **Phonological Neighborhood Density** or the number of words that sound similar to a target word. On the other hand, an interface (focal system) serves as a computational mediation mapping phonological representation and distributed conceptual representation; it is rather storage of relational information (isomorphism, form-to-form).

3. The bio-syllable: from typological models in iconicity and instantiation

3.1 The phonological-prosodic (lexical) model of iconcity in English and Tachelhiyt Berber

We should first emphasize that we deal with iconicity in English and Berber from a phonological/prosodic perspective. English phonosthemes [51] belong to phonotactic clustering at the interface of phonological and prosodic derivation processes. They represent important clues for the lexicon (distinctiveness for instance), although they cannot be considered as morphs and they are not represented as such [52], they occur

at phono-morphological errors across potential sensitive allomorphic processes. Furthermore, dealing with Berber [53] reduplication iconicity, we should first pinpoint the reason why we would not apply a morphological auto-segmental model proposed by McCarthy and others [54, 55] to study templatic languages. We consider the semitic root [56, 57] as a category to study Berber reduplication, emphasizing nonetheless that this last has been adapted [58] by early berberologists under the influence of semitic epistemology and not from an internal point of view.

Moreover, reduplication has been posited by the grammars rather as a reconstruction method widely interested in defining the morphological structure of the root/scheme of the verb (biliteral/triliteral roots), leading to a heterogeneous dealing between the definition of the etymon (diachronic, non-analytical object) and the verbal root lacking morpho-semantic thematicity unlike Arabic and Hebrew morphology (Hebrew Binyanim and Arabic awzān). Thus, what have been called Berber roots are, in our consideration, verbal individual consonantal templates of a formative principle (formantization) enabling flectional and reduced derivational processes. An example from this heterogeneous fact is the following table:

Template "Root"/ example	Allomorphic form	Phono-morphological process	Lexical distinctiveness
GN — g^{w}nenni (aorist: rolling)	No	Yes (reduplication)	No (diachronic or dialectal)
GN — gn (aorist: sleeping)	Yes	Yes (tensing /g/)	Flectional-aspectual (ign (perfect he slept/ ar iggan continuous he's sleeping)

From which we can conclude that Berber reduplication [59] (except expressivity driven forms) is purely iconic in the sense that a segment of the lexical template undergoes a semantic process that implement its meaning or motivates it across its phono-lexical constituents (describing the process, the case in its aspectual nature, intensity, result, etc.). Henceforth, we will deal with lexical intra-reduplication patterns on their CV skeletons as following:

Formative-verbal individual root	Reduplicative pattern (with lexical melody)	Inventory
C_aC_b	$C_aC_bV_1C'_bV_1 / C_aC_bV_1C'_bC'_bV_2$	RF/RG/SM: RG ---rgagi: shake and tremble
$C_aC_bC_c$	$C_aC_bV_1C'_bC'_BC_c$	ZMG/CTL: ZMG ---- Zmummeg: smile pleasantly
$C_aC_bC_CC_d$	$C_aC_bC_CC'_BC_d$	SKRS ---- Skerkes: to lie

If this reduplication could be defined as an example for iconicity (or analytical one), in the sense of Downing and Stiebels [60], phonosthemes present stable quantitative syllabic-prosodic patterns on phonotactic levels (onset/coda positions or on both) based on the following rules:

Phonotactic position	Taxemes	Cluster/lexical inventory
Onset (2/3 rules)	T_1 (O)	/spr/, /st/: spread, stare
Coda (2/3 rules)	T_2 (C)	/mbl/, /zl/: mumble, dazzle
Onset.coda (2/3.1 and 2/3.2 rules)	T_3 (O.C)	/fl/./ʃ/, /gr/./pl/: flush, grapple

3.2 Iconicity and instanciators

Our approach, whose frame we have presented earlier, grounds in iconicity defined as form/structure imitation and form/structure schematization of meaning from a non-morphological perspective. We would henceforth adopt the framework of gestural scores and phonological-prosodic representations of both English clusters and Berber sequences.
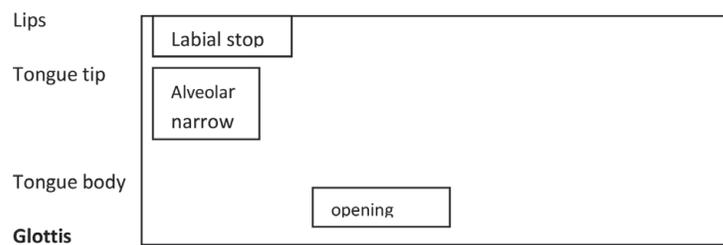
3.2.1 English typological processes

3.2.1.1 English 2/3 C and O/2.3

We focus in the following both phonosthemic rules from the perspective of gestural scores (subsegment) and syllabic structure:

• 2/3 cluster rules (T1 (O)): inventory example (/sp/ in <spell>)

We adopt the approach of articulatory phonology considering gestures as potential units of sub-segmental events [61–63]. We thus describe gestural taxemes that enable segment insertion models in iconicity:
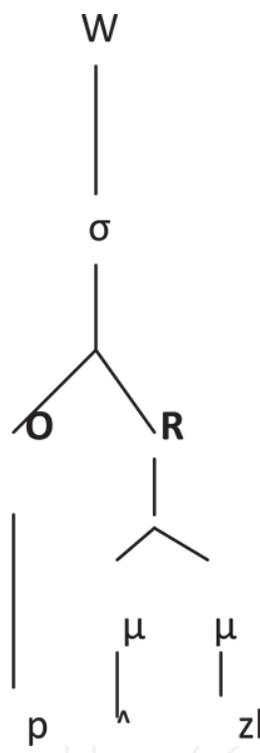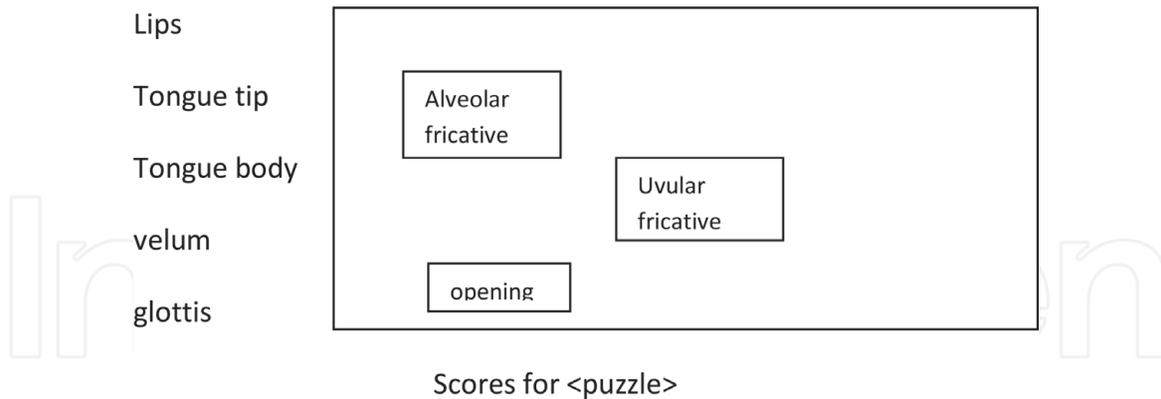
• The gestural scores for word initial <spell>:

• Featural/prosodic structure /spell/
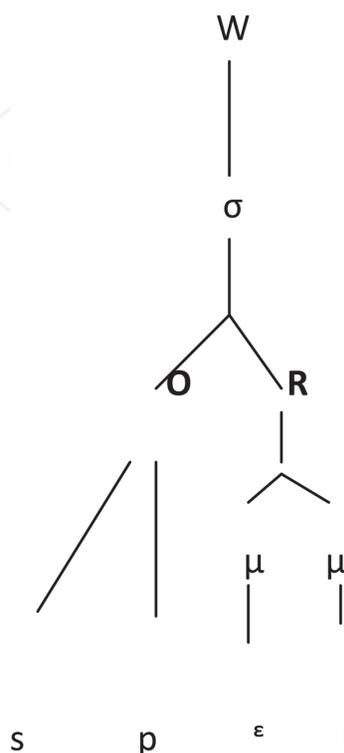
- T2 (C): gestural /feature prosodic structures: <puzzle>

Lips	
Tongue tip	Alveolar fricative
Tongue body	Uvular fricative
velum	
glottis	opening

Scores for <puzzle>

Based on both gestural and phonological/prosodic structures, we would first pinpoint that the phasing rules of prevocalic/postvolcalic consonants (see Browman et al.) in clusters are restricted by the vowel (the so called C-center effect) which makes both coda-onset consonants dependent on vowel (nucleus) timing. We then hypothesize a lexical timing process related to sensitiveness. This would bring us to analyze both mirroring effect of 2/3 rules and their permutations within the phonotactic frame.

3.2.2 Phonotactic and lexical-semantic iconicity

3.2.2.1 Onset deletion-adding rules: 2/3 clusters

We hypothesize that 2/3 onset rules in English are gestural/featural deletion modes adding/deleting rules from both lexicon/syllable analysis oriented toward semantic clustering and conceptual framing of the verbs. We first, would like to underline that seen from the segmental point of view, addition/deletion rules of SSP

principle [64] are preserving or violating rules that stipulate sonority instructions for the representation on both coda/onset positions [65, 66]. Other approaches suggest some of these rules could be intuited from the lexicon [67]. Furthermore, instructions from moraic weight and sonority principle can explain why these rules are not preserved by many natural languages as shown by Zec [68].

3.2.2.2 3/2 deletion principle: English onsets

/skr/ → /kr/

- Gestural instructions: deleting the alveolar fricative and opening the glottis.

- SSP principle: preserving SSP for the syllable peak.

- Sequencing deletion: from the sonority hierarchy rule (3 2 1): obstruent stops 3 (OS)—obstruent fricative 2 (OF)—Approximants (A)
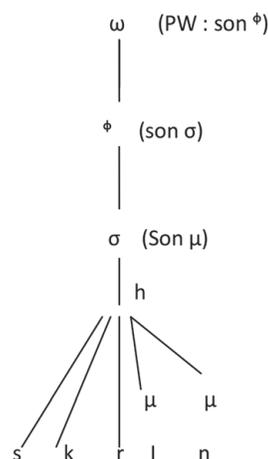
    a. Only 2 (OF) > 3 (OS) <1 (A)

    b. And 3 (OS) <1 (A)

Are elicited adopting the frame of both optimality theory [69] and the sonority/weight derivation hierarchy, (a) and (b) optimal rules we emphasize in the following:

- First, abrupt rise in sonority is more preferred [70, 71]

- Then, mora—sonority hierarchy as claimed by D. Zac (2003) may also explain this case:

Minimal Sonority Threshold Imposition

Where: weight is ruled by head/constituents and hierarchy levels on the syllable. It also emphasizes the lexical basis of deletion/adding principle.

3.2.2.3 2/3 deletion principle: English codas

/mbl/ → /bl/
Gestural principle:

- Closing/opening the glottis

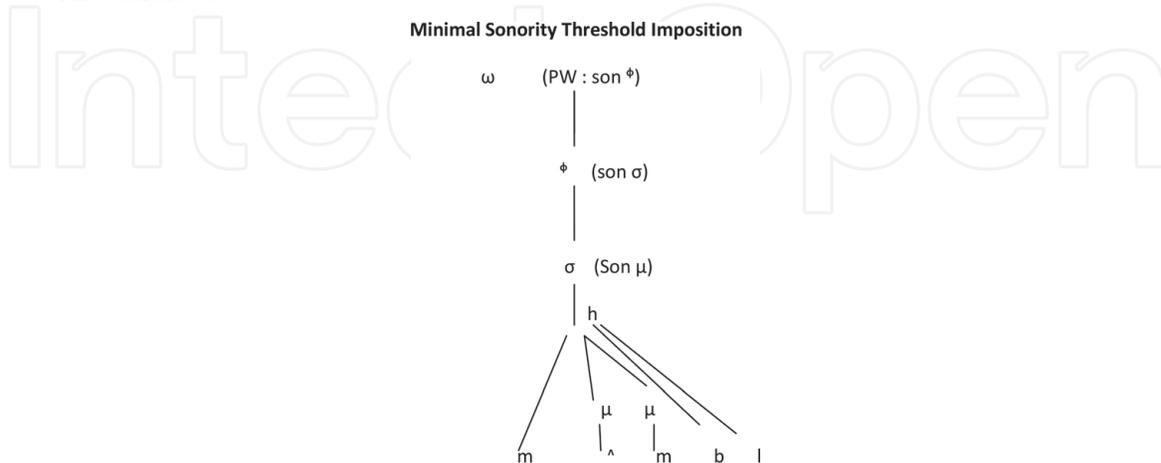SSP principle

• Preserving the SSP postvolcalic coda

Sequencing deletion: from the rule 3 2 1
Obstruent Stop OS (3) ------ A (2) ----- nasals (1)
Only: N (1) > OS (3) <A (2)
And OS 3 < A 2
Are elicited.

Minimal Sonority Threshold Imposition

After defining the deletion/adding rules from gestural to computational levels and instructions, we address in the following section the sequencing permutation models.

3.2.2.4 Inversion rules framework and Sequencing Permutations (SQP)

• T 1 (O) / T2 (O): T1 (C) and inventories:

Many inversion rules have been suggested as universal rules of onset/coda positions [72]. On the other hand, we have adopted a mathematical permutation model to address the phonotactic gestural/featural components and their class selections.

If the set E_{CO} is the set of natural articulatory classes defined by its sonority scale for the syllable, then the group of possible permutation in E is a bijection of E on E and I_{de} is the identity of the set E_{co}

$E_{co}\{A_{os}, B_{oa}, C_{of}, D_n, E_a\}$ respectively stops, affricates, fricatives, nasals, approximants

For instance, we can multiply cycles considering the rightmost cycle first:

Representing a universal set of articulation (evidence has been shown elsewhere that the universal SSP is retrieved to recognize words in segmentation [73]. Thus the basic relation could be patterns permitted, geometrically and algebraically, and schematized in the Cayley table for pentagon and cyclic notations (rotations and reflections for D5) [74].

Possible universal clustering on onset/coda positions could be calculated within these forms either using a schematic rotation with a selection value or deriving algebraically the orbit and the cycles from a set of 1 to n elements (1–5).

Furthermore, this universal principle grounding in both SSP and categorical perception [75]—nonetheless, the last study brings another evidence of variable categorical behavior in perception for clusters. It relies on a more biological robust basis for neural processing of categories, along with the gestural combinatory basis allowing us to predict from what we term SQP (sequencing permutation model) a specific language selection on the binary computation level:

Positions/ clustering	English permutation—class clusters for the syllable-	Cluster inventory for selecting iconicity clusters	Lexical inventory samples
ONSET	(3,5)[1], (3,1,5), (3,4), (1,5), (3,1), (5,5)	• (3,5): /fl/, /sl/, /ʃr/, /sw/	• Flee, slide, shrink, sway
		• (3,1,5): /spl/, /spr/ /skr/,/ str/, /skw/	• Splay, spread, scream, stray, squeeze
		• (3,4): /sm/, /sn/	• Smack, sneeze
		• (1,5): /gl/, /gr/ /kl/, /tw/, / br/, /kw/, /pl/, /bl/, /dr/, / θr/	• Gleam, grab, clap, twine, breath, quell, plug, blur, draw, throw
		• (3,1): /sp/, /st/, /sk/	• Spare, stare, skip
		• (5,5): /wr/	• Wrap, write
CODA	(3,1,5), (4,1,5), (3,5), (1,5), (3,1), (4,1), (5,3) and 3,2 singletons	• (3,1,5): /stl/	• Whistle
		• (4,1,5): /mpl/, /ndl/, /mbl/ ,/ŋgl/, /ŋkl/	• Rumple, bundle, rumble, mingle, rankle
		• (3,5): /zl/, /fl/	• Dazzle, shuffle
		• (1,5): /kl/, /gl/, /bl/, /dl/, / pl/	• Tackle, juggle, wobble, saddle, ripple
		• (3,1): /ft/	• Shift, lift
		• (4,1): /mp/, /mb/, /nd/, / nt/	• Bump, comb, send, hint
		• (5,3) /lv/	• Delve, halve, shelve
		• 3 singl.: /ʃ/	• Dash, mash, lash
		• 2 singl. /tʃ/	• Pitch, patch, catch

[1]*(1, 2, 3, 4, 5) stand for these universal articulatory classes: 1—A_{os}, 2—B_{oa}, 3—C_{of}, 4—D_n, 5—E_a.*

Moreover, we only focus in this article on onset/coda processes of clustering knowing that coda.onset structures of iconicity bear an important dimension in both lexical distinctiveness/statistics but also in argument and semantic structure. We also exclude singletons from our clustering perspective; the frame would be different on both onset/coda positions.

3.2.2.5 Onset structure

Beyond any statistical account of onset (English), we notice other permutation processes between T2–T3 forms already discussed in the abovementioned addition/ deletion frames. Without, any symmetrical or mirroring effect, do these forms specify any phonological/prosodic or semantic processes?

- Sonority principles/stress

From onset cyclic permutations (3, 1, 5), (3,5), (1,5), (3,1), (3,4) we can notice the important role of prevocalic approximants (r, j, w, l) matching both gestural C-center phasing and SSP principle (increasing sonority at the contact with the nucleus). Only one cluster cycle is violating SSP (3, 1/fricative stops), it relies on the laryngeal feature (voicing) harmony on onset, lexical onset/coda unvoiced/voiced co-occurrences seem to be the rule of a harmony balance.

Stress considerations are more sensitive to the hypothesis of stress-sonority interactions and the so called *sonority driven stress* which integrates stress information in a supra-segmental-prosodic level [76]. Stress Encapsulation Universals seems to be violated in sonorant clusters and feature [+/− sonorant] can be derived in stress. Onset structures are then supposed to influence vowel stress of the syllable.

What is the iconicity principle from this phonological/prosodic information on both computation of the lexicon based on the hypothesis of the bio-syllable and mental syllabary. Instructions implying both conceptual frames (verb frames: language/world segmentation) and semic structures (language semantic structure) seem to map (onto) and distribute lexical semantic meaning on the phonological prosodic structure based on these previous hypotheses:

3.2.2.6 First hypotheses

- Clusters are valence—case determining which derive the verb argument

- Clusters indicate the diathesis distribution of the process

- Clusters can specify the aspect

3.2.2.7 Second hypotheses

- Position specifies classematic categories integrating both encyclopedic and sublogic principles of the semantic structure

- Position can specify the case and actant roles within the process

- Position could be articulated (onset/coda) in resultative processes adding iconic markers on coda position

- Recognition in acquisition is sensitive to both encyclopedic/lexeme instructions and opts for catalysis.

To describe the semantic articulation of both general/specifying, lexeme/encyclopedia frames we will define some patterns on onset position. We first postulate that these distinctions relate to the nature of syllable/gesture interaction as encoding both concepts and semantic structure of the lexicon relying on bio-schematic principles to be discussed more accurately in the next section. Secondly, encyclopedic instruction integrates both taxemic (sememic taxemes) organization of the verb or its sememic segmentation of the action continuum specifying its semantic organization and its distribution nuclei as a cognitive frame—this specificity distinguishes verb sememes from other sememes—[77–79].

3.2.3 Onset semantic structure for iconicity

3.2.3.1 2/3 clustering permutations

Beyond the debate between lexicon (defining the dictionary) and encyclopedia that opposes structuralists, cognitive semanticists and semioticians [80–83] as to what distinguishes the cognitive frame from proper semic/sememic or semantemic/classematic poles of morpheme/lexeme boundaries [84, 85], recent analytical accounts in minimalism/syntax and biolinguistics focus on the biosemiotic nature of meaning and action merge specification [86] within the debate of C-I interface (conceptual-intentional interface) [87, 88]. Since foundational Millikan's notion of Biosemantics, we gained more interest in the way teleological/Intentional categories are mapped on both biological/structural forms to shape meaning. Moreover, recent studies [89] based on neuro-imaging integration, attempt to link non-linguistic and linguistic information to syntax levels or Syntax Driven Semantics.

We would like to propose a frame of the semantic mapping based on permutative computation on the intersection of multilayer semantics [90] on lexeme/morpheme interactions. These permutations select iconic cues on the lexicon encoded on both bio-schemes "instantiation" and the structure in a modular way:
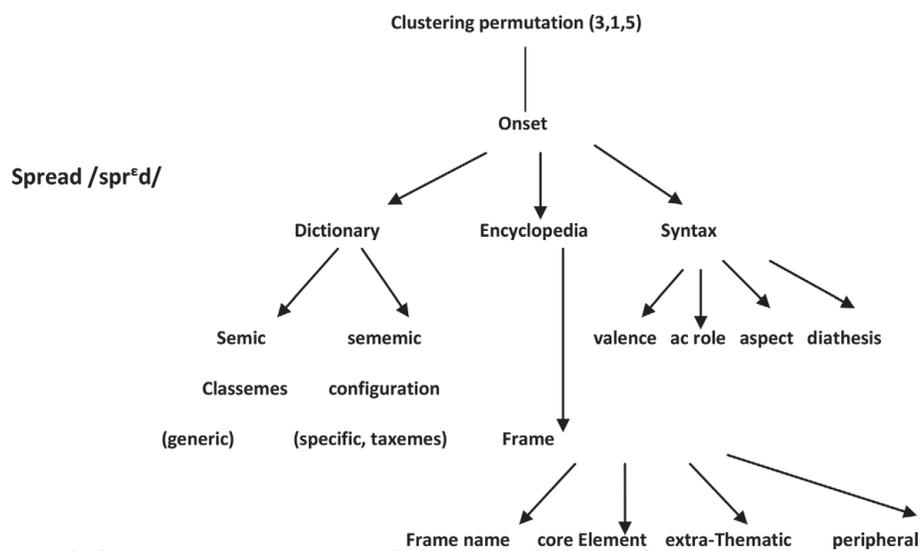
The semantic-conceptual structure of Spread /spr/ (multilayer frame): "he *spread* a tomato bowl on the floor then *stared* at his friend mopping reddish vegetables" (from an experiment: Bakrim 2019 in progress).

- **Dictionary:**

    Semic classemes: [+action], [+source], [+predicate], [+manner], [+ process], [+target]

    Sememic configuration (specific taxemes): //external//, //release//, //target//, //topic//

- **Encyclopedia (Frame):**

    Frame name: Dispersal, ***Core elements:*** *agent, cause, individuals, result, ---,* ***Peripheral:*** place

- **Syntax**

Valence: bivalent, *role,* agent, *aspect*: discontinuous, *diathesis:* subject/object causation

Stare /st/: (3,1)

- **Dictionary:**

*Semic classemes***:** [+state], [+source], [+predicate], [+manner]

*Sememic configuration (specific taxemes)***:** //external//, //axis//, //intent//, //focus//, //perception verb//

- **Encyclopedia (Frame):**

Frame name: active perception, *Core elements:* perceiver, phenomenon, direction*, extra-thematic:* depictive, location of protagonist *Peripheral:* place, purpose, duration

- **Syntax**

Valence: bivalent, *role* agent, *aspect*: continuous, *diathesis:* subject-object causation

Deletion/addition clusters operating on permutative selection patterns imply semantic specification (semic, taxemic and encyclopedic). On the other hand, this specification entails reversely a lexical description model able to distinguish morphological and lexicological processes form frame/domains.

Iconicity of coda permutative structures

- **"John *whistled* oddly in the backyard. *Puzzled*, Jack came out to see"**

Whistle /stl/: (3,1,5)

- **Dictionary:**

*Semic classemes***:** [+sound], [+source], [+predicate], [+manner], [−target]

*Sememic configuration (specific taxemes)***:** //external//, //unaddressed//, //indiscrete//, //topic//

- **Encyclopedia (Frame):**

Frame name: make noise, *Core elements:* noisy event, sound*,* sound source *extra-thematic:* circumstances, depictive, location of the protagonist *Peripheral:* manner, place

- **Syntax**

Valence: monovalent, *role* agent, *aspect*: continuous, *diathesis:* intransitive

Puzzle /zl/: (3,5)

- **Dictionary:**

*Semic classemes***:** [+target], [+state], [+manner], [-source], [+voice]

*Sememic configuration (specific taxemes)*: //emotion//, //exclamative//, //passive//, //reaction//

- **Encyclopedia (Frame):**

Frame name: stimulated emotion *Core elements:* event, experiencer, stimulus *extra-thematic:* circumstances, depictive, explanation, result *Peripheral:* time, degree, manner

- **Syntax**

Valence: bivalent, *role* patient, *aspect*: discontinuous, *diathesis:* passive causation

We, first, should pinpoint that coda-onset permutations contrast verb argument nature with the frame of non-action (non-motor frame) lexicalizing the specification of sensory stimulus /target forms and world description. The verb has multi-layer frames whereas, on the syntactic levels, the process and its roles present, on coda forms, more specific semantic forms. We would like to summarize those modes in the following:
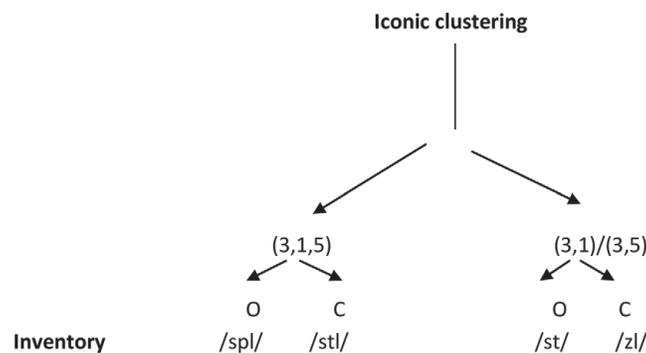
Segmental/prosodic parameters: labial/dental commutation (onset), voicing correlation (coda), SSP violating/peak maintaining—Sonority-weight derived—susceptible of sonority driven stress on the lexical level
Semantic contrasts
Major contrasts: sensory—motor/source-target/cause-result, extra-somatic—somatic
On-coda: action-emotion, actant and aspect shift, position specifications, strong-weak, assertive-speculative
On-On: tension—release, reflexive—repercusive, reactive—active
Coda-coda: external-internal, causation-affection, aspect shift,

3.2.4 Gestural-featural organization of reduplication: Tamazight (Tachlhiyt Berber)

We have already emphasized the non-morphological relevance of the root frame to account for lexical level description. Both its partial productivity, the lack of a wide representation of triconsonantal patterns in the Berber lexicon but also the lack of morphological-semantic thematicity unlike other Semitic languages (Berber is a Hamito-Semitic language). Thus, phonetic-phonological processes are more adapted to these candidates of "pure iconicity."
Studies [91] relying on gestural organizing patterns of reduplication emphasize the copying of contiguous gestures in the representational process

deriving the computation of the form. Berber reduplication studies, draw on the morphological point of view [92] although pinpointing both copying and geminating processes. Furthermore, typological reduplication forms have been traced back to a well-established diachronic/synchronic structure [93]. We will focus on demonstrating how copying gestures on the gestural level and binding syllables by gemination (moraic representation) are the basis of iconic process mapping from onto meaning without recurring to morphological processes. [94, 95].

- **Gestural scores and gesture copying of the second consonant in Tachlhyit Berber**

We would present the lexical forms of second consonant reduplication (first and second pattern):

$C_aC_b - C_aC_bC_c$ in SM $\longrightarrow$ smummi (moan and cry) , ZMG $\longrightarrow$ zmummeg (smile)

<smummi>•

_____
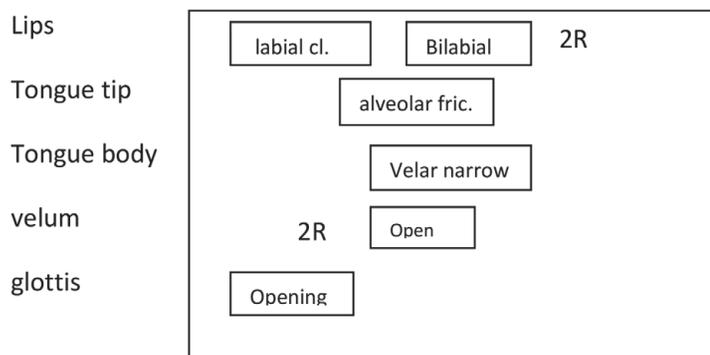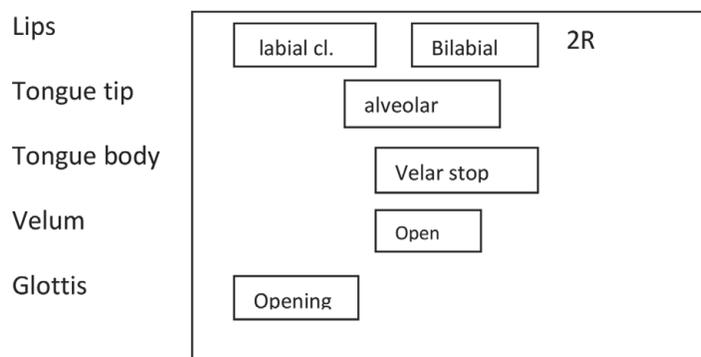
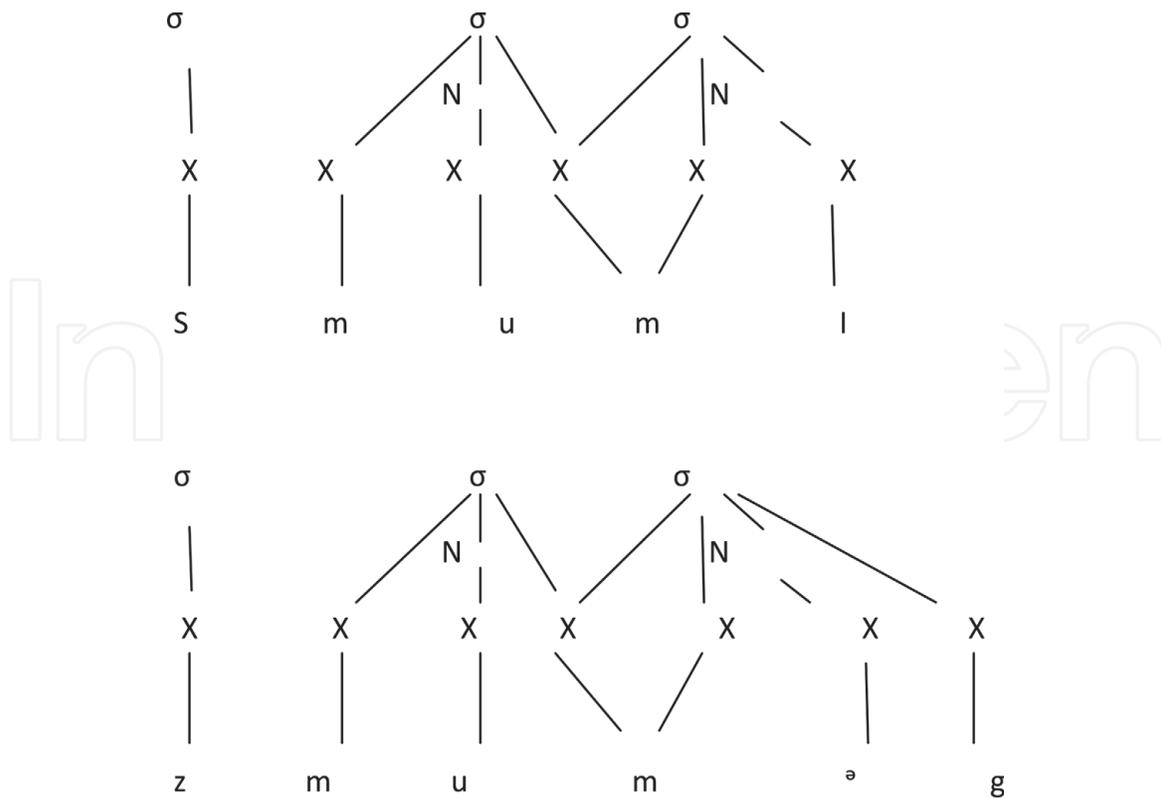• 2R : is the reduplication of the gesture.

Gestural copying of the second consonant

<zmummeg>

- **The phonological/prosodic structure: the binding**

We represent herein the binding structure of both lexical forms.

The role of ambisyllabic frame is well known to analysts who have scrutinized typological Berber forms [94], its representation of Berber geminate consonants evokes length as a criteria between phonetic implementation/acoustic realization and phonological representation. Moreover, copying and gestural sensitive reduplication would be strongly ruled by minimalist hypotheses of language evolution explained by new insights into internal merge/external merge relations: the mapping principle advocated by Safir [96] postulates that some of the syntactic specific and insensitive relations may have been designed as an evolutionary shift first, from the recursive embedding to interpretable structures generated by merge relations.

From our hypothesis, we postulate that copying and binding as two computation instructions may explain one of the aspects of the bio-syllable as represented representation: for syllable frame, combinatorics is a strong mathematical hypothesis related to neural representation of neuron firing pattern [97].

Neural encoding principle may have preceded on the evolutionary level the semiotic principle of sensory-motor symbolic on which the dynamic frame of the represented representation may have derived its interpretive states embedded hierarchically or modularly either in an evolutionary mathematical abstraction arising as a language faculty [1] (upper Paleolithic) or in a non-linguistic state of evolution [98].

The copying-binding relation could be treated as a case of combinatorial patterns parallel to clustering languages, both related by a principle enabling a mediation between morphological variation [99] and form-to-form structures encapsulating a copy of their own making—so to speak.

Furthermore, the gestural dimension within both dynamic/combinatorial aspects and its organic sensory-motor shape (articulatory/phonatory and respiratory systems) suggests a hypothetical mathematical topology of both formants/resonance place and manner.

Sequencing iconcity in Berber reduplication

Before addressing our specific point, we would first expose the question of replication as model of reduplication from both biological/mathematical models and

those underlying them [100]: for instance, Kolmogorov's contribution to study nucleation probabilities. Sequencing with duplication models (and clustering) understood in a complex dimension suggests for us the following dimensions:

1. Parameters for physical phasing and space distribution (phonetics/acoustics)

2. Probability of a minimal (e) let it be a phonological/prosodic event of copying/binding in a language A (Berber, in this case) on a maximal pattern of both semantic and phonetic continua

3. The probability q that the reduplicated d would license the reduplicant R_d

4. The licensing capacity of D(s) (s for segment) is the probability density of this origin to permit bidirectional bifurcation (binding and gemination or doubling)

From Kolmogorov general complexity theorem

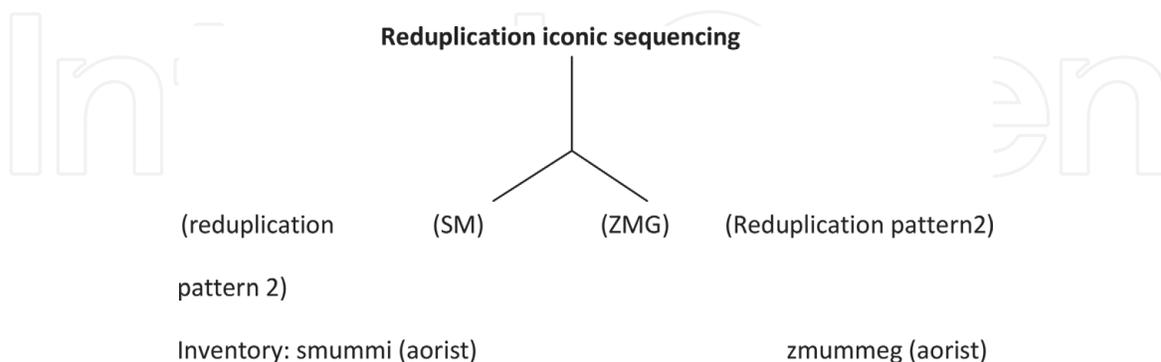$$K_{tu}(w) = \min l(p)$$
$$P : t_u(p) = w \tag{1}$$

Where t_u is any universal Turing machine or (cognitive-brain computation) that can both read the input and the description (the hypothetic device to read a string w in any articulatory domain), min being the minimal length or program that outputs w. Then (C_t is the hypothetic-analytical representation of w or the event of reduplication on both lexicon/phonetic dimensions). We obtain [101]:

$$K_E(w) = K_{tu}(W) + C_t \tag{2}$$

This probability would be topologically calculated as an integral function whose limits are to be defined on time limits (phasing limits) $-\infty/+\infty$:

$$\int_{-\infty}^{+\infty} Pi(t)dt = qi \tag{3}$$

Being $q_i < 1$ the condition under which a reduplication is not possible.

Reduplication iconic sequencing

(reduplication   (SM)   (ZMG)   (Reduplication pattern2)

pattern 2)

Inventory: smummi (aorist)   zmummeg (aorist)

"ar ismummuy wazzan ɣ tgira nns. lliɣ Igelleb yufad tamɣart ann ar tsmussu ifassen s tmatarin lli jjun ur issin. Iswingem imik, iferk i anamk nns. Izmummeg acku ur tufi mamnk ad as tini ass tajjbirt nnk"[3]

------

[3] The child *cried* behind his back. When he turned, he found the same woman desperately gesturing unknown signs. He paused to guess the meaning of the conveyed message then he soon understood the point. It made him *smile* for he noticed that she couldn't find a way to tell him fasten the bag" (from an experiment in progress … ..).

Reduplication and the semantic structure
Smummi:

- **Dictionary:**

  *Semic classemes***:** [+expression], [+manner], [+target], [+sound], [+ change]

  *Sememic configuration (specific taxemes)***:** //externally manifested//, //strident//, //involuntarily affecting//, //cry//

- **Encyclopedia (Frame):**

  Frame name: communication noise *Core elements:* speaker, voice *extra-thematic:* internal cause *Peripheral:* Manner, place, degree

  Valence: Monovalent, *role* agent *aspect*: continuous, *diathesis:* intransitive

Zmummeg:

- **Dictionary:**

  *Semic classemes***:** [+expression], [+manner], [+source], [−sound], [+change]

  *Sememic configuration (specific taxemes)***:** //externally manifested//, //light//, //voluntarily//, //discrete//

- **Encyclopedia (Frame):**

  Frame name: making faces *Core elements:* agent, body part *extra-thematic:* cognate event, depictive, location of the protagonist, path of gaze *Peripheral:* degree, time, external cause

- **Syntax**

  Valence: monovalent, *role* agent *aspect*: discontinous *diathesis:* intransitive

We will discuss both semantic implication of iconicity later on in our conclusions.

4. The internal gestalt and its perspectives: the biolinguistic instantiation or "from the internal to the external language"

As we have discussed it before, structure-world is a de-squared Gestalt of both the semiotic principle and sensory-motor schemes of mapping world onto meaning and meaning onto world. Before presenting a language model of instantiation, we would like to sum up some of the principles and hypotheses of the bio-syllable as dynamic-static "nucleus" of the *represented representation*, as sensory-motor, social, psychological mediation between nature and culture that enables both form principle of language and the self-reflection loop of world-structure (including iconicity).

4.1 The syllable in the brain and the represented representation

Beyond analysis/derivation as a part of deductive, generative or meta-linguistic rationality of a hypothetic object but also beyond the object in its real dimension (the existence of such linguistic object in our hypothesis), the syllable exemplifies a language model at the interface of evolutionary and sensory-motor semio-genesis that enables us to think out the linguistic gestalt in the following terms:

- **the gestural sub-segmental organization is a topological-neurobiological model of instantiation**

Represented representation is this complex schematization of a mapping model suggesting first the topological mathematical organization of the articulatory/vocal tract organic principle. Beyond the formant principle and its acoustic physical implication, the gestural mode of speech, on the syllable-lexicon level is a topological model of dynamics (morpho-dynamics) that articulates formal representations of speech production/perception in a bidirectional way: what would be the implication of the permutation in a topological space represented by vocal tract/articulatory systems on form and selection events? It supposes a biological/topological interface of both semio/morphogenesis [102]. On the other hand, mental lexicon/mental syllable have been suggested as models of both generative syntax and phonological specification of the syntactic device. From the psycholinguistic point of view [103], both encoding/computing may enhance the acoustic realization of words.

It entails the activation of a neural image of structure imitating structure and structure imitating the world (anamorphosis and morphosis). Iconicity would then be a specific module for internal lexicon and syntactic structures.

We would henceforth expose a threefold model of instantiation:

- Instantiation as event

- Instantiation as schematization

- Instantiation as functional modularity

4.2 Instantiation as an event

We distinguish herein between a unitary speech event (or experience) and the complex neural/anatomical network of its processing in a way that activates both semantic and phonological consciousness on a predisposition scheme to link contingent continuum and discrete representation/articulation.

Within the semio-genesis on both continuum/discrete, form/substance levels, the biological instantiation of speech relies likewise the situational basis of an uttering event (enunciation) on the spatial/temporal parameters of representation and articulation. Beyond the phenomenological event of its intentionality, neurobiological instantiation is the set of coordination enabling the co-construction of both articulatory-semantic events of speech [104], from/into structure and from/into world.

- **Event structure for bidirectional representation: production/perception of the lexis**

- Event structure for lexical—semantic components:

We hypothesize specific neural networks on both motoric/conceptual regions of the brain enabling the computation of a space-time event of speech on gestural/articulatory levels. It triggers both memory/lexicon sub-events of speech (retrieval, lexical basis for gestures and articulation, Formant calculus and phasing but specifically gestural pointing and targeting). Interaction adjustment parameters enable then a referential event of speech biologically instantiated.

- Event structure for lexical-encyclopedic representation:

We already know the evidence of construction grammars and verb argument on the link between action verb semantics and mirror neuron system [33, 104]. It implies graphs for visual/linguistic mapping, both universal and typologically determined [105]. Activation and inhibition relate event structure thank either neural group connections (mental inhibitors) or allow a flow of ions (synaptic frame).

4.3 Instantiation as schematization

Neural schematization has been posited as a theoretical model called Schema theory by Arbib's et al. [106], arguing that this last is the basis for cognitive knowledge or a system of schemata enabling the relation between action and interpretation. Production/perception neural maps are responsible of translating cognitive schemata (or their assemblage) of speech components into sensory-motor images.

4.3.1 Neural maps for sequencing

Copying a phonological—prosodic form onto gestural levels require specific schemas for sequencing, neural maps for copying/deleting or copying/binding enabling both the gestural-phonological interface, the gestural-lexical interface for a determined sequence. It has been proven that mirror neurons form hidden sequences [107] of sensory-motor observed/enacted actions.

4.3.2 Hierarchization

The representation of hierarchical language schemas (trees, skeletal events, semantic arborescence, featural arborescence, etc.) is a computational model supported by both computation vs algorithm distribution of minimalist syntax theory and many recent theories of language [108]. Motor hierarchy and abstraction hierarchy ground in mirror neurons frame or adopt other neurocognitive approaches. Links have been advocated between Mirror neuron system and the motor theory of speech perception within the consideration that hierarchy in instantiation relates always on the role of abstract higher levels. This model of consciousness and abstraction [109] includes motor control hierarchy and representation (derivation) into one framework. Moreover, a strict distinction is needed between anatomical location and hierarchy principles. Beyond actual dual models of speech (DIVA model [110]). We will thus refer to the hierarchical model of Dana Ballard suggesting a specification of speech sensory-motor brain abstraction.

	Operating system	
	Sensory-motor representation	**Analytical-computation**
Selection	Gestures probabilities/scores	Segmental/auto-segmental analysis/events
Runtime	Phasing sequences/co-articulation	Prosodic derivation (accent/weight)
Behavior	Framing the gestural model of the lexicon	Morpho-lexical distinctiveness/conceptual-semantic frames
Routines	Acoustic spectral modulation	Acoustic formant/harmony analysis
Calibration	Motor control circuitry	Feed-forward/feedback systems
Neural level	Mapping/mirror neuron system	Neural scheme

4.4 Instantiation as functional modularity

We consider dual stream models as the expression of an epistemic link between consciousness (proto-consciousness) and functional anatomy, more specifically, brain streams and circuitry. This expression, let us say its heuristic robustness, is in considering lateralization and brain anatomical mapping as a set of interpretive networks for language and speech processing. Two recent approaches of dual stream have been dealing with theoretical/empirical (including normal/pathological speech behavior) with the significance of dual distribution for phonology/semantics or for the bidirectional conditions of the representation. We will in the following scrutinize the functional networks of DIVA-model (Direction into Velocities of Articulators), and the Dual Stream Model of Language (dorsal-ventral) before scrutinizing their functional networks:

Field/ pattern	Principle	Brain articulation model	Brain interface models	Brain topology
Phonetics/ phonology	• Dorsal-ventral stream (DSM) • Control system (feed-forward/ feedback) (DVM)	• High order networks/ articulatory phonological networks —conceptual ((DSM) • Circuitry (DVM)	• Interfacing sensory-motor links • Mapping (DVM) • Conceptual interfacing	• Lateralization (left-dominant/ bilateral (DSM)
Semantics	• Ventral stream (DSM)	• Combinatorial network (DSM) • Conceptual network (DSM)	• Lexical interface	• Wide distributed (DSM) • Weak left hemisphere bias

Beyond Instantiation, both models suppose a complex functional modular and anatomic modularity when connectivity is a map that enables us to read out what we call "the internal gestalt of language." We will deal henceforth with the purpose of modularity/connectivity[4] [111, 112]. We should emphasize the fact that brain relies on a complex gestalt organization ranging from randomness, small worldness to modularity [113].

The dual stream model of speech is fairly well designed based on a clear modular organization with graphs and nodes specifying edge relations, interests in speech processing involve regions and linkedness of highly important notions.

Mathematically speaking, a modular structure could be conceptualized throughout Poisson's Model of distribution (Reference … .) based on the following equation:
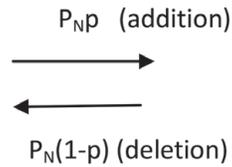
$$P(X = x) = \frac{\lambda^x e^{-\lambda}}{x!} \tag{4}$$

x is a sequence: x = 0, 1, 2, 3 … ; λ = number of the occurrences in the interval; and *e* = Euler's constant $\simeq 2.71828$.
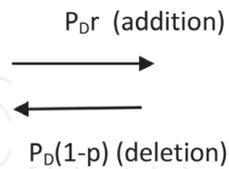
Connectivity is also the probability of a node event that could be either added or deleted on the network:

---

[4] We use the term modularity to refer to the gestalt A with a specific task, processing, ruling function, innately anchored, neurally defined and not assembled.
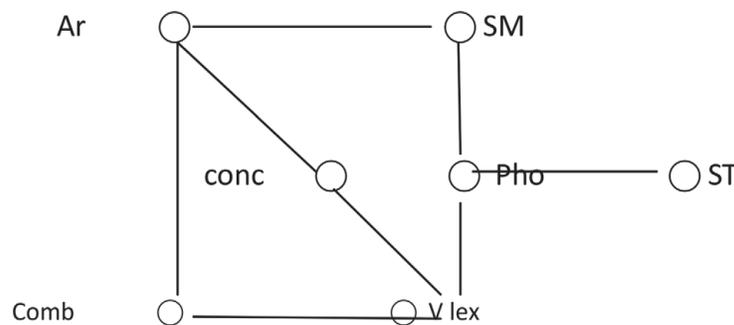
Node:

$$P_N p \quad \text{(addition)}$$
$$\longrightarrow$$
$$\longleftarrow$$
$$P_N(1\text{-}p) \text{ (deletion)}$$

Edge:

$$P_D r \quad \text{(addition)}$$
$$\longrightarrow$$
$$\longleftarrow$$
$$P_D(1\text{-}p) \text{ (deletion)}$$

We could then consider the modularity of the dual stream model, thus also a certain conceptualization of the internal language based on the aforementioned considerations:

Modularity of Dual Stream Theory

Ar: articulatory network, SM: sensorimotor interface, Pho: phonological net-work, ST: spectrotemporal analysis, Vlex: lexical interface, Comb: combinatorial network, Conc: conceptual network.

We consider first connectiveness of physiological (brain-anatomy/motor con-trol) and physical (physical/acoustic mapping) as determined by an isolated edge the network. Moreover, the links between nodes are more important within: first, dorsal processes than between ventral processes. The functionality of articulatory-phonology-lexical nodes is more specific and less hypothetical than the articulatory-lexical connectivity.

How to read out this modularity?

This modular structure, or the internal gestalt verifies our first postulate of a "de-squared" object between phonological/phonetic and lexical/semantic process of meaning. Isomorphic processes between content form and expression form are covering the real gestalt object which is a world/structure of an embodied language.

Therefore and targeting the specific case of iconicity, we think that the com-plexity of the object and its points of view orientate us toward a biological mode of meaning within a third order beyond nature and culture: the bios.

4.4.1 Some conclusions on iconicity and biolinguistic instantiation

Based on our previous discussion of instantiation as being a point of view grounded in the relation of the linguistic gestalt to itself and to the world, we could, within the debate of iconicity referring to the Plato-Aristotle discussion and to its relevance for us, hypothesize these following levels:

4.4.1.1 The structure from within or the embodied representation

Deriving from our previous modular discussion, we understand both dynamic onto-biology and proto-consciousness as the condition upon which the structure is instantiated mapping the organic network on the representational/analytical network and these lasts on production/perception. The modular internal gestalt, de-squared and complexified, along with the articulartory-phonatory topology provide a good understanding of the way language has been adopting an evolutionary inclusion principle that enables, beyond semiotic articulation, the instantiation of external structures by internal ones. Far from being a simple faithful neural instantiation of a schematic construct, it is rather the instantiation of a world/structure and a structure/structure principle whose good example we can encounter in the relation between language faculty and competence/performance. If instantiation is not a mechanistic enaction, a fortiori its biolinguistic point of view, it can be considered as a trace-bearing point of view that shapes both the surfacing forms and the link between points of view creating the perspective of world-structure, structure-structure links.

4.4.1.2 Iconicity is a sub-case of a biolinguistic projection

We should, first of all, retake our former postulate relating to iconicity as being distinct from motivation. Iconicity supposes a mode of articulation that could not be regarded as an "abnormal" link between *distinctiveness* and *significativeness* -though relying on the lexicon—it is a proper mode of schematizing structure-to-structure processes. Back to my Berber case, semantics of reduplication, both language and cognitive frame semantics considered, the reduplication event—likewise clustering-points out the gestalt principle of the lexicon as both intersection and hierarchy of multiple components: the probable adjustment of the internal sensory-motor computation to a twofold model of neural and gestural coordination on the lexical level indicating the relation of the event (internal spatial-temporal network) to a signifying function. Iconicity would be then, more than a rhetorical relation within world-structure resonances; the specific selection of a sequencing organization patterned as a biolinguistic projection.

4.4.1.3 The real object is a complex internal-external structure (a Gestalt)

Our epistemic aim, with the framework of the point of view, is to emphasize the role of proto-consciousness as a biological symbolic system underlying the philosophical-psychological consciousness in the evolutionary integration of sensitive world schemata and sensory-motor principles. The existence of the analytical-representational (computational) dimension of both language faculty and its semiotic principle as an object-method, partly embodying the recognition of biolinguistic structures or supposing the logical-formal deduction is one point of view of the analytical faculty (Universal Grammar/competence) grounded in biolinguistic schemes. The mutual projection relations (their bidirectional links) between this hypothetical object and what we call the real object defines also the complex relations between language immanence and manifestation. On the other hand, modular relations on the internal language level suggest modular relations between the points of view on the object.

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