

The role of matrices in preserving non-genetic data

SERGEI PROSKURIN

Abstract

The article deals with the subject of the ways of preserving non-genetic data in cultural communication. It is emphasized that there exist matrices that are responsible for transferring data through generations. The imitation matrix is a key concept of iconic origin that gives sense to the mimicking of an object. The referential matrices are embedded in the deictic structures of the utterances. The hierarchical senses embody symbol concepts. Behind non-genetic data stands the force of semiosis, that is, of autopoietic nature. The summary of the message is that humans possess stable “outer slots” to be filled with predictable content.

Keywords: matrices; the imitation matrices; referential matrices; hierarchical matrices; a matrix dominant; Behagel's law.

The subject of current research is the storage of non-genetic data in languages and cultures and data transference from generation to generation. The typology of matrices preserving non-genetic data is dependent on the fundamental features of a sign, and its potential power to fill in the content slot. Hereby, we stress the qualitative plausibility of the sign, that is, its existence as some potentiality (this is the first element — qualisign — of the first trichotomy of C. S. Peirce).

From the classical standpoint, namely Peircean theory, it seems useful to use the relation of representamen to its object. In the context of reality, there exist three types of data models: signs-icons, signs-indices, and signs-symbols (this is the second trichotomy elaborated by Peirce).

When the sign acquires the ability to function in languages and cultures with its capacity to make a statement (argument—a part of the third trichotomy in the Peircean approach), its semiotics becomes a cultural heritage, or, put another way, the sign is culturally embodied. It seems just that the enumerated features

of semiosis correspond to analogue matrices, some ethnocultural constituent units, which possess qualities of semiotic prototypes but which are different from the former by their capacity to survive in time.

We use the term matrices for such analogues and consider them as slots to be filled with senses (see Danesi 2007).

Thus, the capacity of a representamen to present the information about the object, its iconicity, is embedded in imitation matrices, described by Piaget in the treatise *La psychogenèse des connaissances et sa signification épistémologique* (Psychogenesis of knowledge and its epistemological significance). Imitation matrices encourage us to restore in memory the objects, and this restoration in memory requires the formation of specific means, which is a semiotic function (“relayed imitation, a symbolic game, an image, which is interiorized imitation, gestures and so on which are added to the sound language”; Piaget 2001: 104, my translation). Imitation matrices are the senses reversed to the past and history; they possess features, reminding one of an object or its availability. They can be nonverbal and verbal, that is, in the form of the language sign. The structure of such signs pretends to imitate the functions, components or other features of the object. Piaget wrote:

I observed how the semiotic function developed in my children. First of all, I did it with my daughter. I offered her a half-opened box of matches having put inside something when she saw it (for example, I put a thimble inside. I stress that the thing that is inside is not edible, later it would be clear why). My daughter tried to open the matchbox to pick up the thing, she turned it in her hands, but she failed to reach the target; at last she stopped to manipulate with the matchbox and was looking at it and started to open and close her mouth. It symbolized what would be done (there was anything edible in the box). One more fact proved such a conclusion. I repeated that experiment four years after and offered a matchbox to my son at the same age. Instead of opening and closing his mouth he cast a look on the half-opened matchbox on his hand and clinched and relieved his hands. Consequently it was symbolization, only that time it was in hand terms. However it was evident that there was a thought about the target to reach. (Piaget 2001: 146, my translation)

Imitation matrices are responsible for transferring cultural data in time through the semiotic function, since they are capable of storing the structural set-up of an object. Thus, the linguistic form of wealth among Indo-Europeans is reflected in the formula for goods and chattels, where it acquires the meaning of the “wealth in total.” The considered formula is a merism, that is, a bipartite structure, which denotes wealth through its components — non-movable and movable riches. However, this binome reveals the sense of all the wealth in comprehension and translations into the other languages. It is evident that this formula copies the structures of reality and that its replicas/ideas are embedded into its form (cf. figure 1).

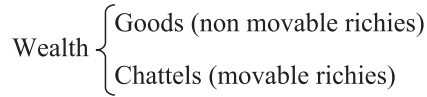


Figure 1. *Indo-European wealth*

Imitation matrices are transferred through generations as ritualized gestures, for example, making the sign of the cross during the prayer.

Indexical signs that are existent *hic et nunc* presuppose a particular set-up of cultural matrices, which we call referential matrices. The core feature of this matrix is its zoning of the senses with respect to the speaker. This matrix consists of the meaningful cells, which are rigidly embedded in the arrangements of references and cannot be altered. Therefore, the Indo-European root **sue* “own” is reflected in the denotations of the zone of the third person singular, as in Latin *suus*. The Russian cognate *svoj* is movable in any zone of the speaker, listener, and the distant person, which is the first person, the second person, and the third person. However, the Indo-European languages have historically contained a primarily referential lexis that was specialized and ascribed to a particular zone of the reference to the first, second, and third persons as in Latin, modern Spanish, Serbian, and Croatian. The three member referential system was specialized as in Serbian utterance *evo meni, eto tebi, eno njemu*: “It is for me, this is for you, and that is for him.” Modern English has a bipartite reference (this/that) and its resource is insufficient to show explicitly the tripartite referential zone that was the protolanguage form of the current references. The replicas of the past however can be reinvigorated in common Russian (where the tripartite system in demonstrative pronouns does not now exist) in the adverbs *zdes* — *tut* — *tam*, which provide the senses of the first, the second, and the third person references. When the Russian speaker denotes the zone of himself, he refers to it as *zdes*, and when the presence of the listener is felt, the speaker can refer to the zone as *tut*, and the adverb of the distant area is *tam* (there). The referential matrix is the basis of the modern syntax, which preserves some relics of the past references even in the Standard European languages: *there is, es gibt, il y a*.

Indexicality is a semiotic phenomenon that is revealed through particular carriers of its meaning in some Indo-European languages — demonstratives, adverbs, etc. Referential matrices do exist in our consciousness as some schemes of references. It is demonstrated by the cryptotypic phonemes, which relate the idea of referential value. A cryptotype is a submerged, subtle, and elusive meaning, corresponding to no actual word, yet shown by linguistic analysis to be functionally important in grammar (as defined primarily by Whorf; see Proskurin 2007). In English, the phoneme *the* (the voiced sound of *th*) occurs only in the cryptotype of demonstrative particles (*the, this, there,*

these, those, thither, than, and probably *thou* and *they* as standing aside of the speaker). Indexicality prevents the speaker from using this sound at the beginning of non-indexical words. Thus, we come across the phenomenon that the vocal sign (phoneme) is a highly specialized gesture in English.

The idea of referential matrices, which originated in the Indo-European demonstrative **t*, is present in Russian indexical words *tot, tam, takoj, tut, teper, togda*, etc., as well as in shifters (pronouns) *ty, tebya, tebe, tvoj*, etc.

If one considers the analogue Germanic *du, das, der, die, da, dort*, the idea of existent referential matrices becomes evident. No doubt there exists a specific cognitive signifier behind that segment of the lexicon. It is not only a matter of common Indo-European prototypes **t, *te* that is reflected in the modern deictic vocabulary. There exist other cryptic particles to be filled in slots as referential cryptotypes, for example, in Croatian, which is */o/*, in Italian, which is */qu/*, etc., and they are dated back to other demonstratives.

Referential matrices have a specific origin and they are established independently in every particular language. They reveal the autopoietic (self-built) nature of their history but they are not created at random. The speaker (the agent of the language) is apt to think of references as commonalities and unite them in a cryptotype unit. Autopoesis of deixis gives evidence of the process of involvement at the moment the speaker feels at one with the space and time. Matrices emerge in the realm of consciousness as if bread were baked in the oven. The bread is never done and produced in real sense of the words “do” and “produce.” The bread emerges due to the created conditions that exist in the oven (temperature, availability of the constituents of the recipe). As an analogous process in language, the current research stipulates the availability of slots to be filled on the basis of the chosen cryptic strategy of deixis. There exists a trend to form expressions of references through homogeneous particles.

Finally, symbol signs are traditionally characterized as ones that are referred to the future. According to our hypothesis, they establish hierarchical matrices, which are stored in memory for a potential use as a list or enumerations of values. Thus, a hierarchical matrix of a word symbol belief can have a variety of arrangements: belief as trust, conviction, and belief as religion, beliefs, cults, etc. Such a hierarchy of values possesses a dominant feature — the matrix dominant, which guides the totality of senses behind the symbol sign.

Hierarchical matrices by themselves reflect a specific semiotic reality because they accommodate the definition of a sign, which dates back to medieval times, *aliquid quid stat pro aliquo* — something that stands for something.

Indo-European cultures preserve non-genetic data in a variety of ways if considered from the semiotic standpoint. I stipulate matrices as carriers of all non-genetic data as a whole, and sign symbols in particular.

The hierarchical matrix of a cultural concept is a formalized sequence (which means that it is not chaotic or arbitrary), which possesses a cultural

value. Matrices reflect various angles of conceptualized data, their total sense and usage. To fill in the matrix of a cultural concept is to bring into the light cultural beliefs and concepts of a people. The collective consciousness chose those features that it recognizes to be meaningful to the given concept. A sequence of enumeration of features in a matrix is not arbitrary but precise and hierarchical. A hierarchy is a consequence of availability of the matrix dominant. This principle of organization of a matrix sheds light on the principle of existence of cultural concepts as symbol signs. Symbol signs have something that stands behind the symbol — that is, a matrix dominant — which is a decisive sense for the sign. It is really so that when we speak that “we believe in God,” “we believe somebody,” we bring about different matrix dominants. The former has a matrix dominant *religion*, the latter — *trust*.

I specify the components that establish the matrix structure: 1) word symbol, the form of the concept; 2) clusters — hierarchy of senses; 3) matrix dominant — differentiating feature, which makes the concept specific in its sense; 4) associative features of the concept — the matrix components (restructuring of the associative features brings about creation of new structures — other matrices).

Thus, the symbol of the concept Belief (as a religious feeling) is shown in table 1:

Table 1. *Hierarchical matrix Belief-faith*

Word symbol	Belief
Matrix dominant	“faith”
Associative features	“religion” “worship” “cult”

The above matrix reflects only one aspect of the concept *belief*, that is, belief as a religious feeling, and one of the senses, or values: adoration of God. If the matrix dominant is *tenet*, it will determine the sense of the concept — belief as the doctrine or a set of religious dogmata, i.e., the English were drawn to Christianity with its strong convictions and its hopes for future life as opposed to the fatalistic gloom and hazy uncertainty of earlier tribal beliefs. In this case, the matrix will have the following build-up.

Table 2. *Hierarchical matrix belief-tenet*

Word symbol	Belief
Matrix dominant	“tenet”
Associative features	“religion” “creed” “doctrine”

It is significant that the more complex linguistic and cultural realms of meaning are also organized on the basis of that principle — matrix dominant. For example, the formula “Faith, hope, charity” has been present in Indo-European texts since the Indo-European peoples turned to Christianity. The formula is a typical collocation of several concepts, that is, the “Dictionary’s” data (paradigmatic data), which is implemented in typical contexts (syntagmatic data). The examples are indicative of the order: Gospel text of the First Epistle of Paul to the Corinthians (existing correlates are German *Glaube, Hoffnung, Liebe*; Dutch *geloof, hoop, liefde*; Russian *vera, nadezhda, ljubov*, etc.).

The cultural theme of the formula presents a hierarchy of senses, which relate the Christian idea of reverence, and, in the layman’s understanding, the idea of the highest values of a person. The formula can be described in terms of a matrix. However, it will be a matrix of a higher order than the matrix of a particular concept. To this end, L. A. Kharlamova and I coined the term *the matrix of the second order* (Proskurin and Kharlamova 2007). The role of meaningful components belong to the constituent concepts, which are *faith, hope, and charity*.

The idea of meaningful enlargement of the described system, that is, structural enlargement has received the name *autopoetica* in modern research — that is, creative self-building.

The formula’s syntagm is the hierarchy of values, but one that is governed by the matrix dominant: “And now abideth faith, hope, charity, these three; but the greatest of these is charity” (1 Corinth. 13.13); these three, therefore, were included by the apostle into the exceptional group, and were raised beyond other virtues and are at the top of Christian values.

The creative self-built structure, which is reflected in the formula of the epistle, possesses deep etymological premises. The modern English belief cognate of Old Saxon *giloþo*, Gothic *galaubeins*, that is, *faith*, is etymologically connected with the modern English word *love* that is traced back to the Indo-European stem **leubh*. There is a Gothic correlation of *lubains* “hope” and *lubo* — “love,” which originated from the same root.

The etymological circle of the formula is built up on the Germanic languages data basis according to the same cultural algorithm of the indication of Christian values and is correlative with the biblical apostle’s epistle:

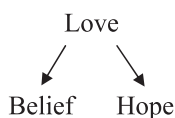


Figure 2. *Etymological net of the formula Belief-Hope-Love (faith, hope, charity)*

The symbol of conceptual build-up is the formula in itself. It includes the governing value — the matrix dominant — the concept love. The significance of such non-semantic sets of entities was defined with the help of the role, which is devoted to the concept that is the last in the series (compare the piece by Benveniste [1970] about syntagmas; the very last, the most beautiful, the very first, etc.).

The stress mark on the last sign of the formula can be seen in Indo-European fairy tales as in Russian fairy tales in verse: *tri syna// starshyj umnyj byl detina, // srednij byl i tak i syak, // mladshyj vovse byl durak*. The stress mark on the last personage who was considered a fool finds its development in the plot of the story in which the very last becomes the most successful and the happiest among three brothers.

Another example is a slogan of the French bourgeois revolution, *liberté, égalité, fraternité*. According to our hypothesis, the last concept in this series is the matrix dominant of the second order. When the formula is examined, it becomes clear that the term *fraternité* is the semantically leading one in the correlative etymologies of Indo-European *kinship* with respect to the term *liberty*. To be free or to have freedom (*liberty*) among Indo-Europeans meant to be among the kin, which are marked by the Indo-European word **sue* (terms of relatives **suesor*, **suecor* etc.). The Old Indian *svadhina* or Russian *svo-boda*, “freedom,” are determined by the **sue* and it says that Indo-European kinship ensured the freedom and equality of the member of the group. The synonymous terms of the French formula preserve the given dependencies in the order of enumeration — the last concept is the governing value of the formula.

Similar trends are evident in Behagel's law of increasing members, which “rests on a plethora of examples from Germanic, Greek, and the other Indo-European languages that show the stylistic figure of enumerations of entities whereby only the last receives an epithet: ‘X and Y and snaggle-toothed Z’” (Watkins 1995: 24). Our discovery of the matrix build-up of the formula with the dominant last concept gives evidence of the enlarged version of the Behagel's poetic law with respect to the Indo-European tradition (for example, including the prose and formulae). I show that the last member is not only stylistically marked but semiotically identified as the leading one. It not only increases with the help of the epithet, but it is also a focus of the utterance that determines etymologically, semantically, and semiotically the other members of the formula.

Φίλῦλλα
Δαμαρέτα τ' ἐρατά τε Φιανθεμίς

Philulla
and Damareta and lovely Wiantemis. (Watkins 1995: 31)

From the standpoint of historic poetics, such enumerations have definite peculiarities in their build-up. Once Benveniste noted the characterological marking of the last member in the series, when special emphasis is placed on the last from the enumerated elements. In its message, this observation correlates with Behagel's law, according to which formulae tend to increase the last member (Watkins 1995: 167). An illustration of this law is the example from Archaic Latin in Cato's *suouitaurlia* prayer, *De agri cult* 141.3:

Fundi terrae agrique mei
Lustriandi lustrique faciendi ergo

To *purify* and *perform the purification*
Of my farm, land, and field.

Here the force is not climatic but iterative: a doubling to yield the figure Argument + Synonymous Argument. The verb phrase (N+V) follows (V) as always; the grammatically heavier phrase comes last, in accord with Behagel's law of increasing members (Watkins 1995: 167).

In the following excerpt from the Prologue to Chaucer's *The Canterbury Tales*, I spotted the increasing member of the enumeration in the formula that is considered in this article, faith, hope, love.

And foughten for our faith at Tramissine
And born him wel, as of so litel space,
In hope to stonden in his lady grace
So hote he lovede, that by nightertale
He slepte namore than dooth a nightingale

The formula is transformed by Chaucer with the increasing of the last member in the series being the verb, which is given in the past, *lovede*. At the same time, the formula is increased with the grammatic supplement *so hote*, which characterizes the verb *lovede*.

The increase of the last member in enumerations is something more than the inherited trait of the poetic word order, the principle that is the inbuilt one in Indo-European poetry. The principle is valid for prose and, to my mind, belongs to the mode of thinking of Indo-Europeans. The Epistle of the apostle Paul is not a piece of poetry, yet nevertheless the principle is embedded in the utterance: And now abides faith, hope, charity; but the greatest of these is charity.

The third and last (compare the maxim: *last but not least*) is love. The significance of this virtue in comparison with *faith* and *hope* is exceptionally high; it is the utmost Christian virtue. Therefore charity, love occupies the last position in the syntagma. The considered episode includes the emphasis on the last

member because it is increased with the accent *the greatest of these is love*. The means of accentuation of the last member and the focus of the utterance can be considered as a particular case of an increasing member in the prose.

Christopher Wordsworth, who interpreted the First Epistle lines in the eighteenth century, used a rich stock of poetic means, simultaneously stressing the matrix dominant of the same formula in the hymn “Gracious Spirit, Holy Ghost”:

- | | |
|---|---|
| 1. Gracious Spirit, Holy Ghost,
Taught by thee we covet most,
Of thy gifts at Pentecost,
Holy heavenly love. | 4. Faith will vanish into sight;
Hope be emptied in delight;
Love in heaven will shine more bright;
Therefore, give us love. |
| 2. Love is kind, and suffers long,
Love is meek, and thinks no wrong,
Love than death itself more strong;
Therefore, give us love. | 5. Faith and hope and love we see,
Joining hand in hand, agree,
But the greatest of the three
And the best, is love. |
| 3. Prophecy will fade away,
Melting in the light of day;
Love will ever with us stay;
Therefore, give us love. | 6. From the overshadowing
Of thy gold and silver wing,
Shed on us, who to thee sing,
Holy heavenly love. |

Behagel's law is evident in the motif of this verse, which copies the idea of the heaviest and the most significant dominant sense of the formula. The principle of the heaviest member was first implemented in prosaic messages.

The idea that the formulae in Indo-European are associated with counting can be explained by the list-like type of preserving non-genetic data. For example, matrices are embedded in alphabetical texts as in Old Russian *Азъ — Букы — Вѣду* or Gothic *Aza — Berkna — Geba*, which are matrices with the meaningful messages of that time; the former “I know the letters” and the latter “Odin birch (material for writing of that time) gave.” In addition, these texts contain counting to three (one, two, three). The constituent parts of the formula conceal the counting to three, and the word components of the formula are the counting words of the Indo-European culture. Thus, the Russian tradition reveals the evidence that *вера* (belief) is the first, *надежда* (hope) is the second, and *Любовь* (love) is the third. The Russians name not only living persons (as once in Rome the names of female saints who were killed for their faith in Christ) but spatial objects: mountains, factory smokestacks, etc., in their sequence.

I shed light on the message of non-semantic incursions into the formula. The idea of iconicity, of course, is the main cause of numeric significance of the syntagma as a whole, and its members in particular. Compare *veni, vedi, vici*.

One came, then one saw, then one conquered as a sequence that does not admit the other set-up.

The words of the formula can describe the same fragment of environment and can refer to the same situation of communication, which presupposes the availability of two interlocutors: if one believes, it means that the other gives him confidence to believe; if one hopes, the other gives him hope; if one loves, the other is the subject of love. The one interlocutor presupposes the existence of the other, and their relations remind one of an agreement or the completed arrangements. As Stepanov (2004) put it, the words *faith*, *hope*, *love* establish a closed circle of communication: the believers endow hope upon the one they love (i.e., God). Faith gives birth to hope in a person we believe in, and faithful and reliable partners arouse affection and love. Faithfulness (*faith*) presupposes and even means reliability as justification of one's hopes. When one is characterized as faithful and reliable, then one is characterized by the words that are close synonyms. The vector of the actions can be reversed when one who is in love, one believes and hopes, and the situation can reflect the reciprocal actions when both interlocutors mutually believe, hope, and love. Thus, the vector of the utterance is directed from the first interlocutor to the second, from the second to the first and sometimes in both directions at once. In sequential communication, the vector of the utterance is changeable and interlocutors change their roles.

Summarizing the above, I argue that the formula remains the matrix. Because its matrix dominant can be changed (compare the formula with the restructured elements as in the title of the book written by A. Grün *Glaube. Liebe. Hoffnung* [Faith. Love. Hope]), the governing sense in this matrix of the second order is *hope*. Thus, the higher order is based on the lower order — the hierarchy of values.

In the semiotics of C. S. Peirce, the forms of reference of the representamen to the object were investigated. Such relations are a part of cultural memory. This cultural memory, I submit, has in its basis some fossils that possess stability over generations. Their preservation is guaranteed by the pan-chronous semiotic function, which emerges with the birth of man. Of course, the defined matrices, which are analogues of sign-icons, sign-indices, or sign-symbols, are to some degree idealized models. In actual use, these messages can be represented as combinations of the indicated resources.

Finalizing, in this research we focus on the transference of non-genetic data through generations. The most conspicuous way is the analysis of utterances in the break through periods of human history, that is, for example, early written culture. The research, which has been conducted by collaborator A. S. Tsentner and I showed that the early written texts possess a characterological feature — autoreference. When an oral culture evolves into a written one, it preserves the matrix of pre-written texts, the speaker's formula. The earliest written texts on the artifacts contained the inscriptions that were made on behalf of the thing

itself as if it had been able to speak. However, it was not a personification. Partially, it was the oral habit to signify the speaking personality in the total number of communications. The early written culture preserves this replica of oral cultures in multiple inscriptions of a number of Indo-European traditions.



Figure 3. Melanfy dedicated me, the statue, to Zeus from Fives. *Egyptian bronze base for the statue from Memphis with the inscription in Greek (sixth century B.C; Okasha 1971: 47–48, appendix).*



Figure 4. Myredah made me. *Incomplete carved stone shaft in two pieces (Alnmouth, probably tenth century; Okasha 1971: 48–49, appendix).*

The communicative aspect of the oral tradition is embodied in a number of formulae that are embedded in the early written texts.

In this article, I have provided an outline of semiotic scrutiny of non-genetic information, which can bear fruit unexpected today, but which can also be elucidative in the future.



Figure 5. (left) Ælfgivv owns me. Circular decorated silver with brooch, with legible text thick-set around the perimeter on the face (Cuxton, Tenth century). (right) Aelfred ordered me to be made. Decorated jewel of gold, crystal, and enamel, legible text of gold letters set in panel roundness, letters facing back (Athelney, probably late to early tenth century; Okasha 1971: 63, appendix)

References

- Benveniste, Émile. 1970. *Le vocabulaire des institution indo-européennes*. Paris: Les éditions de minuit.
- Danesi, Marcel. 2007. *The quest for meaning: A guide to semiotic theory and practices*. Toronto: University of Toronto Press.
- Okasha, Elisabeth. 1971. *Anglo-Saxon non-runic inscriptions*. London: Cambridge University Press.
- Piaget Jean. 2001. La psychogenèse des connaissances et sa signification épistémologique. In Yuriy Stepanov (ed.), *Semiotica*, 98–110. Moscow: Akademicheskiiy proekt; Ekaterinburg: Delovaya kniga.
- Proskurin, Sergei. 2007. *Essays on current semiotics: Textbook to the course on semiotics*. Novosibirsk: Novosibirsk State University.
- Proskurin, Sergei & Ludmila Kharlamova. 2007. *Semiotica contseptov*. Novosibirsk: Novosibirsk State University.
- Stepanov, Yuriy. 2004. *Protey: Ocherki khaoticheskoy evolutsii*. Moscow: Yaziki slavianskoy kulturi.
- Watkins, Calvert. 1995. *How to kill a dragon: Aspects of Indo-European poetics*. New York: Oxford University Press.

Sergei Proskurin (b. 1963) is a professor at Novosibirsk State University <s.proskurin@mail.ru>. His research interests include Indo-European semiotics and semiotics of law. His publications include *Konstanti mirovoy kulturi* (with Y. Stepanov, 1993); and “Semiotika indoevropeyskoy kulturi” (2005).