LEXICAL SEMANTICS
COGNITION
and
PHILOSOPHY

edited by Barbara Lewandowska-Tomaszczyk

Łódź University Press • Łódź 1998
Keith Lehrer and Adrienne Lehrer

SEMANTIC FIELDS AND VECTORS OF MEANING

1. Introduction

There are two empirical factors that determine the meaning of a word. The first is the network relations of the word to other words in the language, and the second is the way in which the word is applied to objects. Our objective is to propose an alternative semantic theory of network relations and applications of the word based on empirical findings and philosophical argument concerning indeterminacy of both network relations of the word and application of the word to objects (see Quine 1951; Zadeh 1971; A. Lehrer 1970, 1974 and 1983). We will present a vector theory of network relations within a semantic field, which we call, sense, and a vector theory of applications of a word as well, which we call, reference 1. Sense and reference so construed are aggregations of conflicting empirical factors which may themselves be aggregated to yield the interpretation or meaning of the word for a speaker. The sense, reference and meaning of the word in the public language are, in turn, an aggregation of the conflicting vectors found in the idiolects of individuals.

The truth functional theory of semantics from Tarski (1956) to the present assumes that there is a function, a satisfaction function, for example, that determines the reference of a word in all possible words and thereby determines the semantic or lexical relationships of the word to other words in the language. Such a theory fails to account for two important factors. The first is the indeterminacy of both reference and sense. The indeterminacy of reference and

---

1 Our use of these terms is a departure from the Fregean and other contemporary uses of the terms sense and reference in formal semantics. This is intentional. We wish to make the point that these notions must be reconstructed and redefined to obtain an empirically adequate and psychologically grounded conception of sense and reference. Sense and reference are, for us, factors that causally interact and together constitute the meaning of a word. Though sense and reference influence each other, there is no reason to think that either is fully constrained by or even consistent with the other. This point was noticed by Fodor (1988) in application to functional role semantics.
sense are well documented empirically. Perhaps the most important aspect of indeterminacy is the connection with diachronic change. The synchronic sense and reference of terms contain the possibility of diachronic shift and dynamic change.

At one time atom may have been so defined as to semantically exclude divisible but the possibility of an atom being split would have been understood, nonetheless. Our suggestion is that the possibility of a diachronic shift is reflected in synchronic indeterminacy. The semantic relationships between words are a matter of degree as is our disposition to apply them to objects. The fact of sense and reference being a matter of degree allows for the change of degree responding to a multiplicity of factors which determine them. There is more flexibility in sense and reference than we can represent in truth functional semantics. It is our aim to propose a theory that allows for that flexibility based on indeterminacy. The indeterminacy may be influenced by a multiplicity of factors which we will construe as vectors of mathematical influence. An individual aggregates these vectors by weighted averaging of them yielding the sense and reference of a word in his or her idiolect. The communal language is an aggregation of the vectors of sense and reference of the word in the idiolects of members of the community by a convergence of weighted averaging of them.

The second factor which the standard theory of semantics fails to account for is the conflict or inconsistency between the vectors of sense and reference of a single word in actual usage of an individual. A person might infer red from cherry (ripe sweet) with great certainty, but call the color of the actual perceived cherries maroon. The reference of a word in actual usage does not fully determine the sense of a word nor is it wholly consistent with the sense of a word, and, correspondingly, the sense of a word does not fully determine the reference of a word nor is it wholly consistent with the reference of the word. The relation between the sense and reference of a word is the complicated result of the interaction of social, psychological and historical factors.

The metaphor of vectors and its application to language is due to Ziff (1972: 32) and developed by K. Lehrer (1984) and K. Lehrer and C. Wagner (1980). Ziff writes:

The factors that serve to determine what is said have something of the character of vectors and what is said can be thought of as something of a vector sum. To suggest that the factors that serve to determine what is said can be thought of as vectors is, of course, at once to suggest that they can be represented by directed line segments, that they can sensibly be thought of as forces having a magnitude, a direction in some sort of linguistic space and a sense in which the direction is proceeding. It is also to suggest that one factor can, as it were, serve to deflect another. And what is more important, it is also to suggest that these factors may be active and operative even though owing to the interactions of other factors their action and operation may not be readily apparent. (Ziff 1972: 32)
Our intention is to move from metaphor to mathematical representation. Let us first consider a vector of reference.

2. Vectors of reference

Many suggestions have been made about the determinants of reference (Bach and Harnish 1979). It has been suggested that the reference of word is determined by an ancestral causal relationship to some object to which the word was originally applied. It has been suggested that the assignment of reference of a word is delegated to those most expert in the use of the word. It has been suggested that some prototype determines the use of the word. There is, however, a diversity of factors that determine the meaning of a word and different factors are given different weights by individuals. Most of us would defer to lawyers and judges concerning the reference of the word *felony* as Reid (1785) suggested, some of us would defer to scientists concerning the reference of the word *water* as Putnam (1970, 1975) suggested or *arthritis* as Burge (1979) suggested, and very few of us would defer to anatomists concerning the reference of *arm* as the part between elbow and shoulder.

There are, in fact, multiple influences upon the way in which we apply words even given perfect knowledge of the object to which the word is applied and the circumstances of application. For this reason, a function of reference from a word to an object, of *felony* to a crime, for example, should be considered as a function into the interval between 1 and 0 representing the level of determinacy with which the word is applied to the object by a person $p$. Thus the reference function $r_p$ of person $p$ of a word $f$ to an object $e$, which has the form,

$$r_p(f, e) = n$$

is a vector aggregation of diverse functions $r_{1p}$, $r_{2p}$ and so forth to $r_{jp}$ representing the various factors or vectors that determine $r_p$. The vector aggregation of these functions is a weighted average of the diverse $r_{jp}$ of the person $p$, that is, a sum of products of weights, $w_j$, which, are nonnegative and sum to unity, multiplied times the functions, $r_{jp}$.

Thus we obtain the formula,

$$r_p(f, e) = \sum_{n=1}^{j-1} r_{jp}(f, e)w_j,$$

representing the vector aggregation, that is, the weighted averaging of the factors determining reference. The resulting function, $r_p(f, e)$, is a vector from the word $f$
to a single object \( c \), and is, therefore, only a partial representation of the reference of the word to all objects to which it refers with varying degrees of determinacy. The complete representation of the reference of the word for the person, \( r_p(f) \), is the set of all such functions for all objects \( c \). Formally represented,

\[
r_p(f) = \{r_p(f, e)\}, \text{ for all } c.
\]

Input vectors that are partial representations of reference are aggregated by weighted averaging yielding the set of aggregated output vectors constituting the complete reference of the word.

3. Vectors of sense

The conception of sense that we are applying is due to Lyons (1963, 1968) which he has defined as the "place in a system of relationship which it contracts with other words in the vocabulary" (Lyons 1968: 427). There is a need to localize the system to avoid semantic holism, and the needed localization is that of a semantic field. A semantic field, studied by Lyons (1963, 1968), A. Lehrer (1974), and others is delimited by a subject matter, such as colors, streets (Algeo 1978; A. Lehrer 1992), and so forth. Thus, we think of the sense of a word as place in a system of words describing a subject matter. There is also indeterminacy of sense. In some fields, colors, perhaps, the indeterminacy will be limited, though the example of the color word cherry reveals some indeterminacy here as well when one asks whether cherry semantically implies red or maroon and whether the latter two words are semantically compatible. In other fields, streets, for example, there is considerably more indeterminacy and instability as one notices when one asks what the semantic relations are between avenue, boulevard, street, and road.

There are multiple factors or vectors determining these relations, and the weight we give to them will influence the place of a word, that is, the lexical relationships of the word in a field of terms to which it belongs. These will include the weight we give to authority, the weight we give to definitions used to explain the word to us originally or to clarify the sense subsequently, and, in general, the way in which we apply the word guided by the prototypes and original exemplars used to instruct us.

Thus, just as we proposed that the reference of a word was a vector aggregation or weighted average of the factors influencing reference, so we propose that the same is true of sense. Research indicates a greater stability of sense than reference and, perhaps, less indeterminacy. Moreover, though there is
interaction between sense and reference, that is, the lexical relationships between words in a field influence how we apply the words to objects just as how we apply words to objects influences lexical relationships, the traditional account of some underlying semantic function determining lexical relationships by determining reference is empirically oversimplified. The interpretation of word, what might be thought of as the meaning of word for a person, is itself an aggregation of sense and reference. Thus, we will represent the interpretation or meaning of a word for a person as such an aggregation.

The sense of a word is thus represented as a function $s_p$ of word $f$ to a lexical place $l$ in a semantic field. This function is again numerical admitting of degrees and is formulated as follows:

$$s_p(f, l) = m.$$ 

This function is again a sum of products which represent the weight given to various functions assigning the word the lexical place in question. Thus, we have $s_{1p}, s_{2p}$ and so forth to $s_{jp}$ representing the various factors or vectors determining the lexical place of the word and weights $w_1, w_2$, and so forth to $w_j$ used to aggregate or average the diverse functions of sense. The function of sense is an aggregation or weighted average of the vectors represented by the following formula:

$$s_p(f, l) = \sum_{j=1}^{j=m} s_{jp}(f, l) w_j.$$ 

This is only a partial representation of sense, however. It represents a vector from the word $f$ to a lexical item $l$ in the field, and is, therefore, only a partial representation of the lexical relationships of the word to lexical items in the field. The complete sense of the word, $s_p(f)$, is the set of all such relationships. More formally represented,

$$s_p(f) = \{s_p(f, l)\} \text{, for all } l.$$ 

The diverse functions of partial sense and partial reference are input vectors aggregated by weighted averaging to obtain the sets of functions of partial sense and partial reference of an individual as output vectors. The sets of functions constitute the complete sense and reference of the word for an individual, that is, the sense and reference of the word in the idiolect of the person.

What is empirical meaning of the vectors of sense and reference? They represent, in the case of sense, dispositions to draw inferences in the relevant circumstances from the target word to other words in the semantic field and, in
the case of reference, to apply the word to objects in the relevant circumstances. The fully articulated account of such dispositions would take us beyond the current paper, but the evidence for the existence of such dispositions reflecting indeterminacy is articulated in the experimental results of A. Lehrer (1970). This leaves us, however, with the problem of explaining the meaning of the mathematical process of computation, that is, the aggregation. What is the psychological reality of the weighted averaging?

We resolve conflict and aggregate input vectors by weighted averaging, but we obviously do not carry out the computation reflectively. Are the underlying processes computational states? The weighted averaging required to yield the functions of sense and reference appear too complex for computation. That does not mean that they are unrealistic, however. The sun and the moon move in ways that are represented by gravitational laws without computing the gravitational force of each other. The mathematical representation is a nomological model of the underlying reality whether that of astronomy or psychology. Moreover, the model of vector aggregation appears to be a sound model of neural processing from input to output and is exploited in connectionist models. We choose to remain neutral between alternative accounts of the underlying reality represented by the aggregations of sense and reference and remain content with noting that models of vector activation appear to be the best account of neural activity (Churchland and Sejnowski 1992). The aggregation model, whether computational or not, is one that mirrors the mathematical structure of neural activity. Nomological integrity transcends computational complexity.

4. The meaning vector

The functions of sense and reference for a person yield an interpretation of a word. We might think of the interpretation function for a person $p$ as a meaning function, $m_p(f)$, of the word $f$ for the person $p$. Meaning is a combination of sense and reference rather than some function determining them both.

Should we represent the interpretation of the word $f$ as some simple combination of the functions of sense and reference, for example, as the ordered pair

$$<s_p(f), r_p(f)>,$$

or as some more complicated measure required to represent the meaning of $p$? The answer is that some more complicated measure is needed. The reason is that a person might give different weights to the functions of sense and reference.
This difference of weighting represents a difference of determinateness and stability. In the case of some words the lexical relations will be more stable and less indeterminate than the relations of reference, in the case of words describing colors, for example, while in other cases the relations of reference will be more certain and less indeterminate, in the case of words describing streets, for example.

Thus, the person $p$ gives a certain weight $w_s$ to the representation of sense $s_p(f)$ and another weight $w_r$ to the representation of reference $r_p(f)$. The meaning is the order pair of the weighted representations of sense and reference. The formal representation is the following:

$$m_p(f) = \langle s_p(f)w_s, r_p(f)w_r \rangle.$$

The interpretation of $s_p(f)w_s$ is the weight multiplied by all vectors of sense from a word to a lexical item. More formally,

$$s_p(f)w_s = \{s_p(f, l)w_s\}, \text{ for all } l,$$

just as the interpretation of $r_p(f)w_r$ is the multiplied by all vectors of reference from a word to an object. More formally,

$$r_p(f)w_r = \{r_p(f, e)w_r\}, \text{ for all } e.$$

In short, the weights $w_s$ and $w_r$ are used to represent the indeterminacy of individual relationships of the sense and reference of word and thus effect a comparison of the relative indeterminacy of sense and reference of a word for a person.

This is our formal representation of sense, reference and meaning in the idiolect of an individual. One advantage of the model of aggregation is that it is dynamic and includes a diachronic representation of the influence of various factors on the sense, reference and meaning of a word as the weighted averaging of vectors. We do not suggest that the model will give us an account of conditions of truth, satisfaction or intension as these are used in formal truth functional semantics. The model is intended to capture the psychological realities of indeterminacy of sense and reference and the historical reality of dynamic change. Formal semantics has offered us deep philosophical insights, but we do not think that these insights are illuminating psychologically or historically. Aggregation semantics is intended to supplement formal semantics in the empirical domain rather than replace it in the formal domain.
5. Communal language and social aggregation

The aggregation model of the meaning of a word in an idiolect leaves us with the question of the meaning of a word in the communal language. Individual idiolects cannot be expected to contain identical functions of reference, sense and meaning. For example, it is probable that for persons 1 and 2, \( r_{p1}(f) \neq r_{p2}(f) \), \( s_{p1}(f) \neq s_{p2}(f) \), and \( m_{p1}(f) \neq m_{p2}(f) \). Thus, our aggregation model of semantics appears to leave us with a mathematical representation of reference, sense and meaning in an idiolect but no representation of these notions in a communal language, English, for example.

There are two solutions to the problem of the communal language. The first is to suppose that the semantics of the communal language rests on similarity of the representations of individuals so that, using “≈” as the symbol for similarity or approximate identity, we might say that \( r_{p1}(f) \approx r_{p2}(f) \), \( s_{p1}(f) \approx s_{p2}(f) \), and \( m_{p1}(f) \approx m_{p2}(f) \). Though such similarities do, no doubt, exist, they are an inadequate basis for extrapolating from idiolects to the communal language. First of all, the notion of similarity is not transitive. Consequently, we cannot infer that the similarity relation is satisfied among all members of the community from the premise that it is satisfied among some very large number.

The empirical correlate of the foregoing formal point is that it is unreasonable to expect that the similarity relation would be satisfied for reference, sense and meaning of all words for all individuals. There are empirically established differences in the ways individuals apply words and relate the words to other words in a field. Moreover, we do not need agreement for the purposes of using language and communicating with each other. We only need a method for resolving our differences, for negotiating consensus, rather than actual agreement.

Aggregation offers us a method for negotiating agreement. The model of individual aggregation of various vectors of sense and reference can easily be adapted to yield a theory of social aggregation of sense and reference. Consider first reference and the reference function, \( r_{px}(f, e) \), of individual \( x \) for word \( f \) to object \( e \). These individual reference vectors may be considered as input vectors to be aggregated by weighted averaging to obtain a social reference function, \( r_s(f, e) \). The social reference function is the sum of the products of the individual reference functions, \( r_{px}(f, e) \), multiplied by the diverse weights, \( w_x \), assigned to each function articulating the linguistic respect and authority assigned to an individual with respect to the application of the word \( f \). The mathematical representation is as follows:

\[
r_s(f, e) = \sum_{x=1}^{n} r_{px}(f, e)w_x.
\]
Similarly, the mathematical representation of the social sense function, $s_s(f, l)$, is the following weighted average of individual sense functions, $s_{px}(f, l)$, in terms of the diverse weights, $w_x$, assigned to each individual:

$$s_s(f, l) = \sum_{n=1}^{\infty} s_{px}(f, l)w_x.$$ The complete social sense and reference of $f$ for the community are represented by the set of all such function for $f$ as follows:

$$s_s(f) = \{s_s(f, l)\}, \text{ for all } l$$

and

$$r_s(f) = \{r_s(f, e)\}, \text{ for all } e.$$ The social meaning is the ordered pair of sense and reference with a social weight assigned to the importance of each as follows:

$$m_s(f) = \langle s_s(f)w_s, r_s(f)w_r \rangle.$$ 6. Social weighting

The similarity of the mathematical representations for individual and social functions of sense, reference and meaning is obvious. There is, however, a profound problem of interpretation of the weights used to obtain the social functions. In the case of individuals, the weights are assigned by the individual to different vectors, and, though we might desire an account of how these weights arise in the individual, they are based in individual psychology. The social weights assigned to individual vectors of sense and reference to aggregate them to obtain social functions of sense and reference are, however, mysterious. The weights assigned by members of a speech community to the vectors of sense and reference of themselves and others may be expected to diverge from each other.

It would, moreover, be unrealistic to expect there to be even similarity in the weights all members of a community would assign to a specific person because members of the community would have very diverse knowledge about a specific person ranging from almost complete ignorance to robust information. Indeed, we should expect there to be a range of weights assigned by individuals ranging from near zero in the case of almost complete ignorance to weights near one
when the person is judged by some to be an expert in the field to which the word belongs, to a judge, for example, in the case of the word *felony*. In a community of *n* members, therefore, an individual *x* might be assigned different weights, *w*1*x*, *w*2*x*, and so forth to *w*n*x*, by the *n* members. How are we to extrapolate from these different weights assigned by individuals to a social weight, *w* *x*, to be assigned to *x*? The answer is to be found in negotiation. Members of a speech community do not need to agree about the sense or reference of words in order to communicate, but they do need to be able to negotiate agreement. They need a method for converging toward consensus and proceeding far enough in the convergence to reach mutual understanding.

7. Convergence toward consensus

The strategy for reaching consensus is to give positive weight to others and modify one’s functions of sense and reference in terms of the positive weights one assigns to others. Such modification of sense and reference is a form of aggregation which K. Lehrer (1993) has termed *aggregation respect*. This kind of respect results in modification by aggregating one’s functions of sense and reference with those of others to obtain new functions. An interesting feature of such aggregation is that connectedness between individuals will yield convergence toward consensus. The process of reaching convergence is mathematically equivalent to find the consensual weights, *w*, for each person to obtain the social functions of sense, reference and meaning.

The intuitive idea is easy to understand by considering the simplest example of negotiation between two people, *j* and *k*. Suppose that *j* and *k* agree on the facts of a crime *c*, a computer appropriation of materials from a bank, and about the legal precedents concerning such actions, but they disagree about how appropriate it is to describe the crime as a felony. Person *j* considers it very appropriate, and person *k* less so. Thus, to express this formally,

\[ r_j(f, c) > r_k(f, c). \]

Now suppose that *j* and *k* wish to negotiate their disagreement and are willing to do so by exhibiting aggregation respect for each other, that is, by assigning some positive weight to each other and averaging to obtain a new reference function. The assignment of positive weights consists of dividing a unit between the two people. Thus, person *j* assigns weights *w*jj and *w*jk to himself and *k* which are nonnegative and sum to one, and person *k* assigns weights *w*kk and *w*kf to himself and to *j* which again are nonnegative and sum to one.
Each person considers the functions, \( r_j(f, e) \), \( r_k(f, e) \), of the initial state 0 of disagreement, which, for typographical simplicity, we represent as, \( r^0_j \), \( r^0_k \), and obtains a new state 1 reference function by the following weighted averages:

\[
r^1_j = r^0_j w_{jj} + r^0_k w_{jk} \quad \text{and} \quad r^1_k = r^0_j w_{kj} + r^0_k w_{kk}.
\]

Now these averages will have the result that the state 1 functions, \( r^1_j \), \( r^1_k \), will differ less than the state 0 functions, \( r^0_j \), \( r^0_k \), assuming that each person gives some positive weight to the other. Thus, if such aggregation respect is iterated from state \( n \) to state \( n + 1 \), then the iterated weighted averaging will progress from state to state according to formula:

\[
r^{n+1}_j = r^n_j w_{jj} + r^n_k w_{jk} \quad \text{and} \quad r^{n+1}_k = r^n_j w_{kj} + r^n_k w_{kk}.
\]

If the positive weights assigned remain constant from state to state, then as \( n \) goes to \( \infty \), \( r^n_j \) and \( r^n_k \) converge toward a consensual reference function, \( r_c \). This process of iterated averaging from state to state is mathematically equivalent to finding a set of consensual weights, \( w_j \) and \( w_k \), from which we obtain \( r_c \) by weighted averaging of the initial state functions, that is, \( r_c = r^0_j w_j + r^0_k w_k \). Thus, the process of negotiating a consensual reference function by continued averaging is, mathematically viewed, a process of finding the consensual weight to assign to each person based on the weights they assign to each other to obtain the consensual reference function by averaging the original reference functions of the people involved.

Consider an example. Suppose \( r_j(f, e) = .8 \) and \( r_k(f, e) = .4 \). Now imagine that each person assigns a weight of .1 to the other, and a weight of .9 to himself. By our supposition, the initial state 0 functions are, \( r^0_j = .8 \), and \( r^0_k = .4 \). The state 1 functions resulting from one iteration are then, \( r^1_j = .72 + .04 = .76 \), and \( r^1_k = .08 + .36 = .44 \). As weighted averaging continues, that is, as \( n \) goes to \( \infty \), the process will converge toward .6 as the consensual reference function. This is, of course, mathematically equivalent, to assigning a weight of .5 to each person and averaging the original or initial state values of .4 and .8 to obtain the consensual value of .6.

The consensual weights are a mathematical consequence of the weights that \( j \) and \( k \) assign to each other in aggregation respect. The equal consensual weights are a consequence of the equal amount of weight that \( j \) and \( k \) assign to each, namely, .1. The proportions determine the outcome. Thus, if \( j \) assigned a weight of .1 to \( k \), while \( k \) assigned a weight of .3 to \( j \), the consensual weight assigned to \( j \) as a result of continued averaging would be .75 while the consensual weight
assigned to $k$ would be .25. As result, the consensual value of the reference function would be .7. The proportions again determine the outcome. It is sometimes said that if you meet the other person half way, you will reach agreement. The moral of the story of continued aggregation respect is that if you meet another any part of the way and keep doing it, you will converge toward a consensual point.

The two membered case illustrates how convergence results in a very simple way. The case of many members converges as the result of continued weighted averaging in the same manner as the two membered case provided that connectedness and constancy occur at some state of aggregation. Thus, as $n$ goes to $\infty$, aggregation of members of the group will converge toward a consensual reference function, $r_c$, where continuing aggregation conforms to the following formula of weighted averaging:

$$r_f^{n+1} = \sum_{k=1}^{k=1} r_k^n w_{jk}$$

The process is mathematically equivalent to finding a consensual weight, $w_n$, to assign to each individual and using the weights to average the initial state reference functions of each individual giving us the following equality:

$$r_c = \sum_{n=1}^{i=1} r_i^\alpha w_i.$$  

The interesting feature of the case of more than two members is that members of the group may assign zero weight to many other members, indeed, in principle to all but one other member, and yet achieve connectedness and, hence, convergence. The consequence, therefore, of applying the model to a language community is that consensual values of reference, sense and meaning may result even though many members of the community are ignorant of other members of the community and assign them zero weight. We may, as a consequence of assigning positive weight to those we know, increase indirectly the positive consensual weight of people to whom we assign zero weight, for they may be assigned positive weight by those to whom we assign positive weight. Put in terms of delegating linguistic authority (Putnam), we may indirectly delegate authority to those we do not know by delegating authority to people who delegate authority to them. Of course, the chain of delegation of authority may be yet more indirect when we delegate authority to someone who delegates authority to someone else and so forth to some person completely remote from us.
8. Language as fiction

We suggest that the sense, reference and meaning functions of a communal language are weighted averages of the sense, reference and meaning functions of the idiolects of speakers of the language. The weights are the consensual weights that would result from a process of continued aggregation respect. However, it is clear that the negotiation to reach consensus through continued aggregation respect is rarely completed. The consensual weights which would result from such continued aggregation respect remain implicit in the weight of respect that members of the speech community actually give to other members of the community. Thus, the sense, reference and meaning functions of the communal language are fictions in the way in which the height of the average European woman in 1996 is a fiction. Both fictions are, however, grounded in fact, and, moreover, there is a fact of the matter about such averages. The semantics of a communal language is factually grounded in the semantic functions of idiolects of individuals and the weights that they assign to the linguistic authority of other individuals.

9. Summary

We began with the empirical data of indeterminacy of sense and reference articulated in semantic fields of idiolects of individuals. We argued that the indeterminacy in idiolects is the result of aggregation of conflicting vectors by the individual. We concluded that sense and reference in the communal language are the aggregation of the vectors of sense, reference and weights of linguistic authority assigned by individuals to other individuals in the speech community. In conclusion, we noted the dynamic interaction of the individual and the society shaping the idiolects of individuals and the communal language of the society at the same time. One factor aggregated by an individual will be his or her conception of the sense, reference and meaning of the word in communal language. While sense, reference and meaning of a word in the communal language are an aggregation of the sense, reference and meaning of a word in the idiolects of members of the community, these semantic features in the idiolect of the individual are an aggregation of the vectors of the individual’s conception of the communal semantics of the word. The individual and society constitute a dynamic duo of vector aggregation creating and recreating sense, reference and meaning in semantics fields in the idiolects of individuals and the language of society.
REFERENCES


Quine, W. V. O. (1951) "Two dogmas of empiricism". Philosophical Review. 60: 20–43.


Zadeh, L. (1971) "Quantitative fuzzy semantics". Information Sciences 3: 157