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# Verbalization of Emotions in the Cognitive Theory of Metaphor: An Ontological and Epistemological Aspects

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# Вербализация эмоций в когнитивной теории метафоры: онтогносеологический аспект

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***Abstract.*** The article analyzes the ontological and epistemological bases (onto-epistemological foundations) of emotion verbalization in the framework of the cognitive theory of metaphor. The ontological aspect of the emotion verbalization problem is the identification of emotional markers for different communication environments. The epistemological aspect describes structural models that organize recognized, modulated, and produced emotions for systematization and categorization. The processes of verbalization (conceptualization and lexicalization) of words with emotional coloring and their philosophical meaning, as well as descriptive and normative connotations of metaphors, are shown.

Metaphor is understood as a fundamental cognitive process. Metaphor is not limited only of the language sphere, but is a way of knowing the environment and a way of thinking, including through cognitive scenarios that allow to be aware of emotions and those of interlocutors, or through idealized cognitive models that allow to separate a metaphorical expression from a conceptual metaphor. Within the framework of the onto-epistemological approach, the article discusses the problems of the dynamics of the language code, reveals the mechanisms of recognizing other people's emotions and managing their own emotions in the process of communication.

There is a fundamental interdisciplinarity of research in the field of emotions, which allows to reveal the mechanisms of recognition and modeling of emotions in intelligent systems.

***Keywords:*** *metaphor; emotions; onto-epistemological foundations; cognitive processes*

***Аннотация.*** В статье проанализированы онтогносеологические основания вербализации эмоций в рамках когнитивной теории метафоры. Онтологическим аспектом проблемы вербализации эмоций является выделение эмоциональных маркеров для разных коммуникативных сред. Гносеологический аспект описывает структурные модели, организующие распознаваемые, модулируемые и продуцируемые эмоции для систематизации и категоризации. Показаны процессы вербализации (концептуализации и лексикализации) слов с эмоциональной окраской и их философский смысл, а также дескриптивная и нормативная коннотации метафоры.

Метафора понимается как фундаментальный когнитивный процесс. Метафора не ограничена только языковой сферой, но является способом познания окружающей среды и способом мышления, в том числе через когнитивные сценарии, которые дают возможность осознавать свои эмоции и эмоции собеседников, или через идеализированные когнитивные модели, позволяющие отделить метафорическое выражение от концептуальной метафоры. В рамках онтогносеологического подхода в статье обсуждаются проблемы динамики языкового кода, раскрываются механизмы распознания чужих эмоций и управления собственными эмоциями в процессе коммуникации.

Отмечается междисциплинарность исследований в области эмоций, позволяющая раскрыть механизмы распознавания и моделирования эмоций в интеллектуальных системах.

***Ключевые слова:*** *метафора; эмоции; онтогносеологические основания; когнитивные процессы*

## Introduction

Metaphor can be represented as a way of categorizing and conceptualizing the surrounding reality, if we consider it not only as a speech-mediated cognitive process, but also as a tool for verbalizing emotions that affect the perception of the world.

Language means of expressing emotions in most cases are metaphorical, and metaphor is a verbalized method of thinking about the world. Man thinks in metaphors, categorizing the known and the unknown.

The study of the verbalization of emotions is engaged in psychology, philosophy, and the linguistics of emotions (emotiology). At the same time, emotiology as the science of artistic and expressive means of language is closely related to philosophy as the science of the ultimate bases of knowledge. In addition, emotion recognition is a task of computer and technical sciences. Thus, the study of emotion verbalization becomes an interdisciplinary task. The problem of verbalization of emotions in metaphors has both ontological and epistemological aspects.

## Methods and Equipment

The onto-epistemological approach helps to structure different approaches within a single interdisciplinary task. Social and cultural factors constitute the existential foundations of human existence, and ontological analysis allows them to specify and highlight significant factors of reality. In turn, the epistemological component denotes differences in the ways of cognition and description of the world, defines meanings at the level of discursive constructions. Ontological and epistemological grounds are closely linked, while creating the necessary integrity of the description.

The ontological aspect of the problem of emotions verbalization can be called the allocation of emotional markers, which can be allocated separately for each communicative environment. Note that a person exists in many communication environments and uses them simultaneously. So, if we talk about written communication environment (the main method — analysis of emotional tone in the text), the markers are emotive words, affective words, etc. If we talk about voice communication environment, the markers will be the sounds that identified with certain emotions. If we talk about vision (the main methods are related to the recognition of emotions on the face and body), then, for example, markers can be points by the movement of which emotions are recognized. There are also emotional markers based on such physiological indicators of the body as cardiogram, heart rate, etc. It is important to contact the ontological factor with the epistemological one in using the biofeedback method, since researchers determine (and can change) what will be the marker of the emotion. We should also emphasize the emotional markers identified through eye movements (eye tracking).

All these markers mark the separate emotion. And there are more differences between different people than similarities. But emotion recognition systems are becoming more effective with every year. The main problem is that there are many theories about emotions, but there is no complex theory about emotions as a phenomenon that exists in different communication environments.

The epistemological aspect of emotion verbalization answers the question of how to describe recognized, modulated, and produced emotions. To answer this question, researchers develop structural models that organize a huge number of possible emotions into a common list that can be systematized and categorized.

The problem of describing the organization of the emotional sphere is solved by different researchers in line with two main approaches. First, the dimensional approach in which there is a selection of dimensions that characterize and define emotions. Among the representatives of this approach can be called such as O. S. Arkhipkina, Ch. Osgood, J. Russell, G. Schlosberg.

An example of a study based on a dimensional approach is the map of emotional vocalizations compiled by A. S. Cowen, H. A. Elfenbein, P. Laukka, and D. Keltner (2018).

Criticisms of this approach have been made by R. E. Lucas, E. Diener, R. J. Larsen (2003) regarding how many dimensions should be allocated and how emotional categories will differ from non-emotional ones.

Second, it is the selection of basic emotions, combinations of which generate a variety of emotional phenomena or the approach of basic emotions. Representatives of this approach: P. Ekman, C. Izard, O. Mourer, S. Tomkins. The methodology associated with the basic emotion approach uses control points and micro expressions to construct mathematical models of facial expression. The FACS system (Facial Action Coding System) uses action units (AE) — the main movements performed by individual muscles. AE are numbered. And action descriptors (AD) are also used — movements made by groups of muscles (for example, pushing the lower jaw forward). The intensity is indicated by adding Latin letters from A to E. For example, AE 1A is the most difficult to distinguish movement of AE 1, and AE 1E is the maximum possible intensity for a certain person.

This approach is criticized for the concept of *basic emotion*, since it is difficult to determine which emotions are basic, especially since their number is constantly growing (Ortony & Turner, 1990). The number of basic emotions estimated by researchers ranges from 6 to 26 or more. In addition, you must always consider the presence of the context while recognizing emotions.

The choice of approach is important, since it entails various experimental procedures that are used in the construction of the experiment, the recognition and format of the responses of the subjects, and the way the results are interpreted.

Within the framework of studying the verbalization of emotions in the cognitive theory of metaphor in the written communication environment there is interesting sentiment analysis as the class of content analysis methods in computational linguistics. Goal of this analysis is based on finding markers of opinions in the text (direct opinions and their comparisons). An immediate opinion is a tuple of five elements (*e*, *f*, *o*/*p*, *h*, *t*) that includes entity as a tonality object, as well as the feature properties; orientation or polarity as the author's tonal score; holder as the subject of the tonality and the time, when the opinion was left.

Emotional markers in the text are called emotional verbs and predicate phrases, adjectives and adverbs, as well as the presence of generalizations and moralizations in statements and some extralinguistic means (multiple exclamation marks, the use of uppercase keys and font selection).

In modern systems of automatic determination of emotional evaluation of a text, both multidimensional emotional spaces and one-dimensional ones (positive or negative) can be used. In the well-known semantic thesaurus WordNet-Affect, synsets of verbs, nouns, adjectives, and adverbs representing the description of emotions are manually marked and marked with such emotional categories as joy, fear, anger, sadness, disgust, and surprise. Another thesaurus, SenticNet 2, links concepts at the semantic level and links cognitive information to emotional information (semantics and sentics). SenticNet 2 is built using sentic computing, which is an interdisciplinary approach to analyzing the tonality of text. Sentiment analysis methods are used, for example, in the Twitter sentiment visualization project (Tweet Visualizer Online) (Healey, 2019).

Practical research using sentic calculations conducts on the material of metaphors. Since the nomination of emotions can take place either directly (anger, fear), or through expressions (interjections), or through the description of facial expressions or poses.

For such studies, seems to be effective an approach using cognitive scenarios that allow to be aware of emotions. The works of linguists N. D. Artyunova, T. V. Bulygina, S. G. Vorkachev, and A. Wierzbicka are devoted to the development of cognitive scenarios. Thus, A. Wierzbicka explores the nomination of anger, pity on the material of Russian, English, German and Polish languages (Wierzbicka & Besemeres, 2009). But Wierzbicka talks about semantic primitives, when language penetrates the internal structure of the names of human emotions, lexicalizing them and creating a Natural Semantic Metalanguage (NSM).

The analysis of tonality verbalization in the cognitive theory of metaphor leads to the need to use interdisciplinary research methods that take into account both ontological and epistemological factors.

In philosophy, F. Nietzsche, H. Ortega y Gasset, P. Riker, L. Wittgenstein, E. Cassirer, E. R. Mac Cormack and many others wrote about metaphorical thinking. E. V. Budayev and A. P. Chudinov (2008) reviewed studies of a conceptual metaphor with significant cognitive potential.

According to the cognitive theory of metaphor in the presentation of G. Lakoff and M. Johnson (1980) the metaphorization is based on procedures for processing knowledge structures (frames and scenarios) of two conceptual domains — the source domain and the target domain. Source sphere elements structure the target sphere elements during metaphorical mapping. Metaphor is not limited only to the language sphere, but it is a way of knowing the environment and a way of thinking. Any conceptual structure is metaphorical initially. G. Lakoff and M. Johnson combines linguistics and philosophy, offering an empirical approach to knowledge as opposed to subjectivism and objectivism.

Later, G. Lakoff (1987) outlines the basis of the approach, which has now been modified, called embedded cognition, and says that conciseness grows out of the body foundation. The theory of idealized cognitive models on the basis of language data, helps G. Lakoff separated the metaphorical expression from the conceptual metaphor. Metaphorical expressions are based on sensorimotor experience, and conceptual metaphors are often not recognized as metaphors. Thus, the orientation metaphor with the spatial orientation *happy is up* shows that *happiness* corresponds to *top*. Kinesthetic viewschemes (for example, part-whole/part-whole or source-path-goal/source-path-goal) are dynamic examples of perception processes that give our experience coherence. Language means of expressing emotions are mostly metaphorical. G. Lakoff and M. Johnson argue that "metaphors are essentially phenomena that provide understanding" (Ibid., p. 208).

G. Lakoff and M. Johnson (1999) write that the human conceptual system is formed through sensorimotor systems and give preference to an empirically responsible philosophy, one that relies on the best empirical data. If Lakoff and Johnson talk about the unambiguity of metaphorical projection for two-domain spaces (metaphorical mapping, two-domain mapping), while other researchers talk about conceptual integration

as a generic concept for metaphor (Turner & Fauconnier, 1995). Conceptual integration forms the many-space model.

## Results

Metaphor can be presented as the way to categorize and conceptualize the surrounding reality. Many people's actions are guided by emotions (Izard, 1991). Often emotions do not appear in their pure form and separately but are realized as a cluster of emotions. For example, the group *anger* includes irritation, indignation, rage, resentment, and others. Different degrees of intensity of emotions are reflected in the language.

From an ontological point of view, we should consider the existence of two semiotic systems of emotions — body language and verbal language. Many emotions are expressed by the body, but they are practically not expressed in words. But there is no universal theory of emotions.

If the speaker and listener share a common linguistic knowledge of the external world, several strategies for understanding metaphorical utterances can be implemented. That is, "statements of the form '*S* is *P*', where the speaker metaphorically means that *S* is *R* (for $R \neq P$), the following strategies are separately necessary, and together sufficient" (Searle, 1990, p. 335).

First, there must be a strategy that allows you to recognize that the listener is speaking metaphorically, not literally. Second, "there must be General principles that associate the term *P* (whether its value, truth conditions, or denotation, if there is one) with a set of possible values of *R*" (Ibid.). This is the most important problem of metaphor — the formulation of such principles that connect a term with a set of possible meanings. Third, there must be strategies to limit the range of possible values of *R*, while finding the only value of *R* that was embedded in the metaphor. "The basic principle of this step is that the real values of *R* can only be those possible values of *R* that set the possible properties of *S*" (Ibid.).

Stable metaphorical projections are called *conceptual metaphors*. For European culture, these are, for example, such metaphorical projections: time is money, life is history, love is a journey, etc. So, N. D. Arutiunova (1999) writes about the mosaic of images of an emotion, which leads to the fixation of a set of attributes that serve words related to emotions. If we talk about emotional states in general, then "it should probably be considered the dominant idea of them as a liquid body that fills a person, his soul, heart, taking the form of a vessel" (Ibid., p. 320).

Z. Kövecses (2004) illustrates an end-to-end cross-linguistic analysis of how many concepts of emotion reflect widespread metaphorical patterns of thought. These emotional metaphors arise from repeated embodied experiences, which is one of the reasons why human emotions in many cultures correspond to certain basic biological and physiological processes in the human body and the interaction of the body with the outside world.

G. Lakoff talks about the concept of *body mind* and that we are embedded beings (Lakoff & Johnson, 1999). What is important here is the embodiment of meaning, which is related to spatial orientation. For example, a person is in the state of anxiety. The preposition *in* indicates a location somewhere. In turn, *anxiety* is an abstract concept. But a person is *in trouble* like things in a container or a book in a closet.

*Cognitive models* can be formed based on conceptual metaphors. The theory of idealized cognitive models on the basis of language data allows you to separate a metaphorical expression from a conceptual metaphor. Conceptual metaphors are often not recognized as metaphors, and metaphorical expressions are based on sensorimotor experience. According to G. Lakoff and M. Johnson (1999), we can talk about kinesthetic view-schemes as dynamic patterns of perception that give our experience coherence. It is noted that such image-schemes appear in the minds of children before the corresponding concepts.

Each time specific ideas are activated in our neural circuits, they become stronger. Over time, neural network complexes create the worldview frame through which we see the world. But the main problem is that these frames are unconscious. You do not know about this because you do not have access to your neural circuits. When a person hears facts that do not fit into their worldview, they cannot process them: either ignore them, reject them, or attack them.

M. Johnson gives a huge number of examples of the embodiment of kinesthetic figurative schemes. For example, the figurative scheme *container* includes the concept of a border that separates the internal and external, differentiates "in 'and' out" and conceptualizes human activity. S. Lindner (1981) describes in detail what is hidden behind almost six hundred verbs in combinations with the particle out, and not only in direct uses such as stretch out *to stretch* and in spread out *to expand, unfold, scatter*, but also in metaphorical meanings such as figure out *to understand, solve*, work out *to solve (the problem)*, etc. According to Lindner, there are many metaphors based on the cognitive scheme *container*. We treat things related to the orientations of the body in the language of *receptacles*, and later extend this language to the realm of abstract concepts. For example, *coming out of a daze* is metaphorical and does not mean literally coming out of a container.

The metaphor performs an epistemological function, forming the area of secondary predicates. Internal properties of a person can be characterized by physical signs: a bright personality, a deep mind, a heavy hand, etc. Based on analogies, metaphors of emotions form *metaphorical fields*. The analogy of liquid, fluid substances (passions boil, drink grief, wave of tenderness), the analogy of fire (the flame of love, feelings overwhelm), the analogy with disease or poison (fever of love, get over love, envy poisons the soul), etc. Metaphors of negative emotions are often based on an analogy with what causes pain through mechanical action (feelings torment, bite, wound, cut to the heart). Positive emotions are expressed more monotonously and diffusely than negative ones. But negative emotions are always more specific, distinct, and diverse (Nöth, 1992, p. 83). All vocabulary in a language can be emotive. V.I. Shakhovsky (2009) notes: "Semantic categorization

of emotions in the lexical system of language is thus represented by emotivity in three statuses: meaning, connotation and potential […]" (p. 39).

I. A. Dmitrieva (2000) identifies two solutions to the problem of semantic innovation: the theory of nomination and the theory of predication. In V. N. Telia's nominative interpretive concept, the model of the metaphorical process consists of entities and their interaction, understood as a relation established by the subject of metaphorization between the features and associative complexes of these entities.

The predicative theory of metaphor through the *epiphore — diaphore* distinction allows us to solve "the problem of the birth of a new meaning on the basis of giving a logical status to similarity as a method of predication (assignment by a logical subject of previously incompatible predicates)" (Dmitrieva, 2000, p. 11).

As it has been effectively summarised by G. Brun and D. Kuenzle (2008), five epistemic functions have been claimed for emotions: motivational force, salience and relevance, access to facts and beliefs, non-propositional contributions to knowledge and understanding, and epistemic efficiency.

M. Minsky (1988) believes that cognitive metaphors draw analogies, representing one object through another, which "allows you to apply the knowledge and experience acquired in one area to solve a problem in another area" (p. 291). Neuroscientists have discovered the integrated functionality of emotions and reasoning in our mental life. Emotions are now understood as a constitutive element of human rationality, justifying the creation of the concept (Candiotto, 2019).

It should be considered that the verbal identification of emotions can be subjective (Diller, 1992). And then we are talking about where exactly the border between a generally valid metaphor and its subjective understanding passes.

In cognitive psychology, E. Roche investigated the problems of categorization and identified basic-level categories or prototypes. Categories have their center and periphery according to their typicality and degree of approximation to the prototype.

E. Roche's early research focused on color categories. In the Dani language of New Guinea, there are two basic color categories: *mili* (a dark color with a cold tint, including green and blue) and *mola* (a light color with a warm tint, including white, red and yellow) (Petkelite, 2011). Roche's research indicated that native speakers of the Dani language chose central colors as examples of two-color categories. For example, the *mola* category was called white, red, or yellow, with different subjects making different decisions.

Other scientists have conducted a similar study on three-year-old children. They were shown a series of colored chips, then hidden and asked to identify the color. Children chose central colors more often than non-central (Heider, 1971).

The central colors correspond to what in later research by E. Roche was called Cognitive Reference Points or prototypes — those members of a category or subcategory that have a special cognitive status: "to be the best example of a category" (Petkelite, 2011, p. 52). For example, a robin is more in line with the idea of a *bird* category than chickens, penguins, or ostriches, and table chairs are more in line with the *chair* category than rocking chairs, shell chairs, and barber chairs or electric chairs.

Prototypes themselves do not form a specific model for processing, representation, or learning. This is so often a source of error that it requires explanation: when we talk about prototypes in general, we are simply referring to a convenient grammatical construct (fiction); here only judgments about the degree of prototyping are real.

## Discussion

Within the framework of the onto-epistemological approach, it is possible to discuss the problems of the dynamics of the language code, the development and implementation of its hidden capabilities, as well as issues of emotional specificity of speech in different communication conditions.

How can emotions be vehicles of knowledge? What is the relationship between emotions and beliefs?

An interesting statement by H. Ortega y Gasset (1990), who characterizes the nominative possibilities of metaphor in relation to the world of emotions, notes:

> It is not surprising that the vocabulary has a small number of words that from the very beginning designated the phenomena of the psyche. Almost all modern psychological terminology is a pure metaphor: words with a specific meaning were adapted to denote phenomena of a psychological order. (p. 76)

In 1985, E. R. Mac Cormac in his work *The Cognitive Theory of Metaphor* defines metaphor as a cognitive process that occurs through the comparison of disparate semantic concepts. As an example of a basic metaphor, he calls the computer metaphor: the brain is analogous to a computational mechanism, while the mind is identified with a set of programs that stimulate the brain.

Many studies use a cognitive-discursive approach to metaphor analysis, since it is impossible to clearly distinguish the cognitive and discursive dimensions of metaphor. Therefore, "metaphor is simultaneously described as both a mental and a linguosocial phenomenon" (Budayev & Chudinov, 2013, p. 11). "The exchange of emotions is an important social activity that is part of everyday conversation and interaction and helps us maintain both our mental and physical health" (Alba-Juez & Larina, 2018, p. 10). The cyclic structure of sense-think-act is in the Dynamic System Theory, a mathematical theory that was conceived to explain physical phenomena such as the movement of celestial bodies but is now also used to explain cognitive phenomena.

Human emotions are at the heart of verbal communication. It is possible to say that a person becomes Homo Sentiens (Shakhovsky, 2008). In this way, the world of philosophy and linguistics has adapted to what is now called the *emotional turn* (Alba-Juez & Larina, 2018).

There is no agreement among researchers on the existence of universal emotional concepts. Emotions are a complex linguistic object (Barrett; Ekman, Izard) and are endowed

with a number of specific features (clusterism, dynamism, continuality, differentiability, implicitness of flow, subjectivity of perception and interpretation, etc.). M. Schwarz-Friezel (2015) describes an emotion as a mental state or process with three main parameters, namely: "(a) value (positive or negative), (b) duration, and (c) intensity" (p. 162).

A. Wierzbicka (1999) speaks about the existence of universal concepts of human culture, where emotional concepts can be represented as elementary semantic primitives. As we said early, the theory of semantic universals assumes the existence of an NSM — Natural Semantic Metalanguage. However, different cultures have different emotional scenarios. The English words *sad* and *sadness* have no exact equivalents in Russian, which has three words for expressing different types of sadness, varying in duration and intensity: *grust*, *pechal* and *toska* (Wierzbicka, 2001). As a result, Russian, unlike English, has a higher number of emotional verbs. It is impossible to distinguish only a few basic human emotions, since they are all the result of interpretation, and are also associated with the lexical *grid of coordinates* of the native language.

Five main areas of cultural complexity related to emotions were identified: (a) the language of emotions, (b) conceptual knowledge of emotions, (c) values related to emotions, (d) rules of feeling, i. e. norms of subjective experience, and (e) rules of display, i. e. norms of emotional expression (Wierzbicka & Besemeres, 2009). These areas are subsystems for system of emotions in different cultures.

Interdisciplinary research helps to reveal the mechanisms of recognizing other people's emotions and managing their own emotions in the process of communication, as well as coordinating and stimulating positive and neutralizing negative emotions in communication acts. How do our thoughts about emotions shape our self-awareness and self-understanding? What role does narrativity play in practical reasoning, and how do emotions contribute to it?

An attempt to formalize gestalts, knowledge structures that are responsible for a person's awareness of a problem situation and decision-making, led to the creation of the frame apparatus — a formal way (in fact, a method) of representing knowledge in image recognition systems (Baranov, 2014). However, it turned out that this method of representation is so convenient and productive (technological) that it makes it possible to build a variety of hypotheses and models of human intellectual behavior.

In addition, interdisciplinary research reveals the mechanisms of emotion recognition and modeling in intelligent systems and identifies the problem of computer recognition and modeling of metaphors.

Thus, D. Rumelhart (1993) proceed from the fact that the metaphorical interpretation of a language expression does not differ significantly from the many different interpretations of sentences of this kind: "The police officer raised his hand and stopped the car" (p. 73). To understand this phrase fully requires a lot of knowledge about the police, police officers, traffic rules, drivers, etc. An intelligent system that models the understanding of the text does not need a special block of interpretation of metaphors. They should be understood as any other idiomatic expressions. This removes the problem

of understanding new metaphors. However, it is not clear what the rules for generating new metaphors should look like in this case.

H. Ortner (2015) studies emotivity in the age of information and communication technologies. He argues that the construction and sharing of emotions is one of the main functions of computer-mediated communication. The metaphor has not only a descriptive, but also a normative connotation: "the metaphors themselves actively convey expectations about the future" (Wyatt, 2004, p. 258). And the normative connotation of the metaphor sets the image of the future.

The neurologist A. Damasio (1994) summarizes a wide variety of case studies; he concludes that emotions are part and parcel of rational thinking and that the absence of emotion can interfere with rationality and intelligent, can render decision making impossible.

> Just as there seem to be cognitive modules for language or problem solving, there may be emotion modules that mediate action in a specific context. The task for cognitive science, then, is to incorporate these emotion modules into models of mind and to specify how the new models interact with the cognitive models already postulated. (Friedenberg and Silverman, 2006, p. 441)

A. Damasio and K. Man (2019) think about homeostasis (the principle of regulation of vital activity) as a way of forming feelings in machines. Under certain conditions, machines capable of implementing a process resembling homeostasis might also acquire a source of motivation and a new means to evaluate behavior, akin to that of feelings in living organizations.

The fundamental innovation of these machines is the introduction of risk-to-self. Traditional concepts of intelligence offer outward-directed perception and abstract problem solving. Damasio and Man view high-level cognition as an outgrowth of resources that originated to solve the ancient biological problem of homeostasis. And the latter is understood as self-interest and the ability to take risks. This approach is very similar to autonomous embedded systems but having a body to help solve problems is not enough to generate meaning. In addition, calculating a certain emotional parameter and labeling it *emotion* does not make this parameter meaningful. Damasio and Man write that a robot concerned with its own survival can creatively solve the problems it faces. Understanding autonomy (as having a sufficient amount of semantic information) is important in relation to the architecture of emotional intellectual systems.

## Conclusion

It is important to understand both the ontological and epistemological status of a metaphor: a metaphor can be both a mental phenomenon and a way of knowing the world. Metaphor is a fundamental cognitive process that organizes our judgments and emotions.

The interweaving of metaphors forms a cognitive map — a network of concepts that connects abstract ideas and human sensorimotor experience.

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