

METAPHOR, EMOTION AND THE HUMAN BRAIN

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One of the most mysterious and at the same time most fascinating questions about human nature has for centuries been the human brain. Although a lot has been revealed about its functioning, there still are many doubts that allure scientists. The human conceptual system, dependent on the one hand on the organization of some functions of the brain and on the other on the on our experience is among those misty grounds, resistant to attempts at any thorough description. It constitutes the basis of perception of the outside world and of proper reaction to events that take place outside the human body, as well as of the perception of the 'self' as an individual functioning in the environment of family and society. At the same time, one of the crucial areas of human existence are emotions. Basic as they are in human life, there seem to be more questions than answers concerning their nature and role. The debate on what is and what is not an emotion, or what is and what is not a particular kind of emotions (is anger and rage more similar to each other than, for example anger and sadness – in some cultures, like among Ugandan people, there seem to be no differentiation between anger and sadness (Davitz, 1969)) is still in progress. The aim of this paper is to briefly present some views on the nature, categorization, and conceptualization of emotions as well as perception of metaphor – the basic way in which emotions are verbalized and which seems to reflect the way emotions are conceptualized in the human mind. Therefore, the paper begins with a short review of two contemporary theories of metaphor.

Metaphor

Since we are normally not aware of our conceptual system, we often act automatically. And that is what makes the thorough description of the human conceptual system so difficult. However, it is not impossible. If it is assumed that the structure of language processes can reflect, at least to some extent, the organization of our conceptual system, even if this reflection cannot be readily deciphered, then from the examination of the way it functions hypotheses can be drawn concerning the way the human conceptual system is organized. In cognitive linguistics metaphor seems to be one of such revealing aspects of language. According to Lakoff and many other researchers metaphor is definitely not a matter of language alone, but rather a matter of thought.

Lakoff and Johnson believe that metaphor, i.e. "understanding and experiencing one thing in terms of another" (1980: 5), constitutes the major part of our conventional way of conceptualizing the world, and it shapes our understanding of experience (Lakoff, 1993: 203). The focus of their study are abstract domains, which, according to them, are conceptualized in terms of more delineated domains. In other words, metaphor is understood as "mapping (in the mathematical sense) from a source domain to a target domain" (Lakoff, 1993: 207). Thus, for example, when we say *Our relationship hit a dead-end street*, we perceive love in terms of a journey; when we decide that something is *in a particular category* or *out of a category*, we perceive classical categories in terms of containers; and when we say *You make my blood boil*, we perceive anger in terms of heat. And anger shall be the focus of this paper, since its main aim is to present an attempt at explaining the way the human conceptual system deals with such abstract domains as emotion.

In the course of their research, Lakoff and Kövecses (1987) found that there may exist a general metaphor for anger. According to them, ANGER IS HEAT is such a metaphor and it exists in two versions; one of them comprises instances where the heat applies to fluids, and the other one, where it applies to solids. In the first case, the outcome is ANGER IS THE HEAT OF A FLUID IN A CONTAINER metaphor, and in the latter, ANGER IS FIRE metaphor. The first version seems to be the more elaborated one, which, according to Lakoff and Kövecses, stems from the fact that ANGER IS HEAT metaphor applied to fluids combines with a general THE BODY IS A CONTAINER FOR THE EMOTIONS metaphor present in our conceptual system and concerning all kinds of emotions, which is illustrated in the following examples:

THE BODY IS A CONTAINER FOR THE EMOTIONS

She couldn't *contain* her joy.

He was *filled* with anger.

This combination yields another central metaphor:

ANGER IS THE HEAT OF A FLUID IN A CONTAINER

You make my *blood boil*.

Simmer down.

I had reached the *boiling point*.

Let him *stew*.

Lakoff and Kövecses claim that the central metaphor analyzed above is a highly productive one. First, the words and fixed expressions of a language can code, in other words, express aspects of, a given conceptual metaphor. Moreover, a given conceptual metaphor can be elaborated, like in the case of verbs such as "stew" or "simmer". Normally, these verbs are applied in the domain of cooking, but here the important fact is not that they originate in this specific domain, but rather that they are special cases where there is a hot fluid in a container, which makes them applicable to a given conceptual metaphor.

Another way in which a conceptual metaphor is productive are metaphorical entailments, that is, carryovers of the details of knowledge that we have about a source domain from this domain to the target domain. In the case under analysis, the source domain is HEAT OF FLUID IN A CONTAINER and the target domain is ANGER. That the central metaphor has an abundant system of such entailments can be seen from the following examples of carryovers:

As we know, when fluids start to boil, they go upward:

WHEN THE INTENSITY OF ANGER INCREASES, THE FLUID RISES

His pent-up anger *welled up* inside him.

She could feel her *gorge rising*.

Pretty soon I was in a *towering rage*.

Heat produces steam and causes pressure on the container:

INTENSE ANGER PRODUCES STEAM

She got *all steamed up*.

Billy's just *blowing off steam*.

I was *fuming*.

INTENSE ANGER PRODUCES PRESSURE ON THE CONTAINER

He was *bursting with anger*.

I could barely *keep it in* any more.

Keeping the pressure back creates a variant of this entailment:

I *suppressed* my anger.

He *turned his anger inward*.

He managed to keep his anger *bottled up* inside him.

When the pressure in the container is too high, the container may explode:

WHEN ANGER BECOMES TOO INTENSE, THE PERSON EXPLODES

When I told him, he just *exploded*.

She *blew up* at me.

We won't tolerate any more of your *outbursts*.

This entailment can be elaborated when special cases are used, for example:

Volcanoes: She *erupted*.

Electricity: I *blew a fuse*.

Bombs: That really *set me off*.

Parts of the container go up in the air during the explosion:

WHEN A PERSON EXPLODES, PARTS OF HIM GO UP IN THE AIR

I *blew my stack*.

I *blew my top*.

She *flipped her lid*.

He *hit the ceiling*.

I *went through the roof*.

When something explodes, what was inside it comes out:

WHEN A PERSON EXPLODES, WHAT WAS INSIDE HIM COMES OUT

His anger finally *came out*.

Smoke was *pouring out of his ears*.

This entailment can be elaborated by using the example of animals giving birth:

She was *having kittens*.

My mother will *have a cow* when I tell her.

One question that arises from this analysis is what is the extent to which this metaphor is universal, i.e. is it possible to find the same metaphors across different languages. In order to find that out in Polish, a Master's Thesis was written and research done on the metaphorical and metonymic expressions of anger obtained from written questionnaires completed by 17 subjects. The results show that the ways of conceptualization of anger in Polish and American English

are similar with respect to the general metaphor, ANGER IS HEAT, proposed by Lakoff and Kövecses. Like in English, it exists in Polish in its two versions: ANGER IS THE HEAT OF A FLUID IN A CONTAINER AND ANGER IS FIRE. Instances of the general THE BODY IS A CONTAINER FOR THE EMOTIONS metaphor are also found in Polish (here the examples illustrate only conceptualization of anger as they are all taken from the experiment focused on this particular emotion, but metaphorical expressions illustrating this metaphor and describing other kinds of emotions, including the positive ones, are also used in Polish) as it can be seen in the following examples:

THE BODY IS A CONTAINER FOR THE EMOTIONS

Zacząłam *wygarniać* wszystko (co mi leżało na sercu)

I began *bring out* everything (that me lay on heart)

"I put my heart on the table"

Wyrzucić *z siebie* wszystko

Throw out *from oneself* everything

"I threw everything out on the table"

Wszystko *się we mnie* gotuje

Everything *itself in me* is boiling

"My blood is boiling"

Niechęć *pozostała we mnie*

Dislike *remained in me*

"My dislike stayed with me"

Zawrzało *we mnie*

Came to boil *in me*

"My blood boiled"

Rosła *we mnie* złość

Was increasing *in me* exasperation

"My exasperation was growing"

Wewnętrzna *walka*

Inner *fight*

"Inner struggle"

Zgromadzone *głęboko w moim wnętrzu* negatywne emocje

Gathered *deeply in my inside* negative emotions

"The built up bad feelings"

The combination of this metaphor with the FLUID version of the ANGER IS HEAT metaphor yields another central metaphor:

ANGER IS THE HEAT OF A FLUID IN A CONTAINER

Aż we mnie zawrzało
Actually in me came to boil
"My blood actually boiled"

Myśli kotłowały się we mnie
Thoughts boiled in a cauldron oneself in me
"My mind was seething"

Wszystko się we mnie gotuje
Everything oneself in me is boiling
"My blood is boiling"

However, one of the subjects completing the second task of the experiment used a phrase which seems not to fit the model of anger proposed by Lakoff and Kövecses. She finished the sentence: "Anger is..." in the following way:

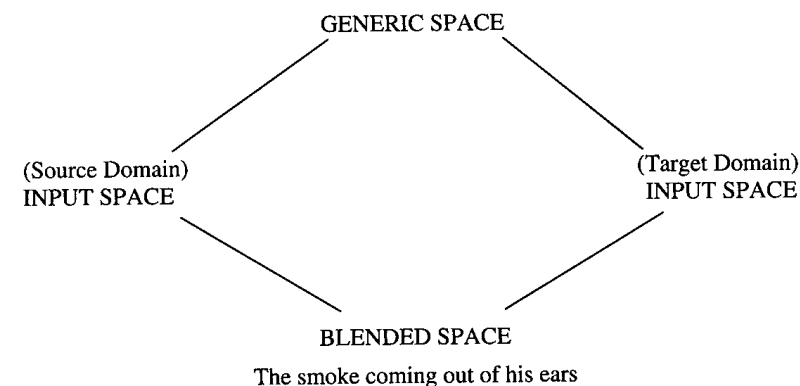
"Gniew to smutek".
"Anger is sadness".
"Gniew to żal utraconych radosnych chwil".
"Anger is regret about joyful moments".

(Rataj, 2001: 76-77)

This example clearly shows that people do not always think about abstract concepts in terms of more sharply delineated ones. For it seems obvious that there is no way in which sadness or regret are more sharply delineated in the human conceptual system than anger. Thus, there must exist another explanation for instances like that. One possibility is to try to explain it by means of the prototype model (Rosch, 1978). If it is assumed that there exists a concept of negative emotion in the human conceptual system and that it is created on the basis of the most prototypical cases of negative emotions, then it seems possible that they can be almost simultaneously thought of via association in a situation when one is required to provide a definition of his or her emotional experience. This would probably provide an explanation at least in the first case because anger and sadness are among the very first emotions experienced and recognized by children, thus there exists a high probability that they are conceptualized as the most prototypical examples of negative emotions.

The conceptual metaphor theory is now a classical approach to metaphor. It has received a lot of criticism, but at the same time it inspired other theories

attempting at the description of metaphor. One of them is the conceptual blending theory perceived by many as a complementary rather than opposing approach to the conceptual metaphor theory. Among the differences between these two theories is the fact that the blending approach involves more general mental mapping mechanisms. According to this theory, instead of two domains, two input (or mental) spaces are introduced, which are particular scenarios structured by the domains. Except for these, there is a generic space, which represents the conceptual structure common to the input spaces, and a blended space, also called the blend, where material from the input spaces combines and interacts. Thus, instead of unidirectional movement from the source domain to the target domain proposed by Lakoff and Johnson, the material is projected from the two inputs onto the blend. Turner and Fauconnier (2000) analyze an example of metaphor of anger in the following way:



They claim that in the blend there is no direct description neither of the source domain (as smoke comes out of kettles on fire) nor the target domain (human physiology does not account for internal combustion). However, it is not completely different from the conventional view as the structure of the blend depends highly on the metaphorical heat to anger mapping described by Lakoff and Johnson.

Another point that Turner and Fauconnier make in their analysis is that the blend can be partially independent of the inputs and elaborated on within itself. For instance, *hat* in the following phrase:

*'God, was he mad. I could the smoke coming out of his ears –
I though his hat would catch fire.'*

has no counterpart in the source domain, but rather the frame of a person on fire is used and elaborated on by the existing mapping operating towards both the source domain (greater heat) and the target domain (greater anger).

This brief and extremely selective presentation of the contemporary approaches to metaphor is important for two reasons. First, it should be emphasized that metaphor is part of human everyday communication and as such should not be neglected in the investigation of language processes. Second, it can reveal an enormous amount of information about the human conceptual system as well as the functioning of the human brain. For this very reason, it has become part of such fields as aphasiology or neurolinguistics. But researchers seem to give it much less attention than they do in the case of literal language, although its interdisciplinary application may bring new answers to many open questions.

Emotions

Categorization

As it has already been said, we use metaphor in order to verbally express abstract phenomena. One of the abstract domains that pervades human life are emotions. However, emotions have been disregarded in cognitive sciences until recently, as they were believed to stand in clear opposition to cognition. According to Bodor (1997), two major approaches were responsible for that state of affairs: biological reductionism and subjectivism.

Biological reductionism

"Emotions are basically phylogenetically or evolutionally evolved moving forces executed by physiological mediation and accompanied by special display patterns" (Bodor, 1997: 196, following e.g. Zajonc & Markus 1984). Although Bodor admits that this biological approach may have a number of important implications in the discussion of emotions, the common assumptions stemming from it are that social factors as well as the role of agents are not present in the analysis of emotions. Certain important consequences follow from this view regarding the relationship of emotions and language, namely, language is understood in terms of a social institution and, therefore, it requires agents, who or which are absent from this account of emotions, when it is used. This approach is commonly summarized as follows: "when it moves us, the dirty animal moves", and its moral is: "Let's repress it" (Bodor 1997: 196).

Arguments of this view were questioned in the light of historical (e.g. Stearns and Stearns 1998) and cultural (Rosaldo 1980) variability of emotional life and emotional vocabularies.

Subjectivism

The main point of this approach is that "emotions are essentially private feelings which are solely subjectively accessible experiences" (Bodor, 1997: 196). Bodor states that in its explicit form this approach is obviously not present in the scientific psychological discussion of emotions because if something is subjective, it cannot come under criticism and so it cannot be the object of studies. However, Bodor (1997: 197) is convinced that this approach to emotions is implicitly present in psychology. It can be summarized as follows: "when it moves us, the untouchable sacred moves", and the moral is: "Let's cultivate it" (Bodor, 1997: 197). Arguments of this view also appear doubtful once it is realized that the referred emotion or mental experience must be chosen or identified unambiguously when a referential device, such as the word "anger", is to be matched to its referent, such as a private feeling of anger. If emotions were private feelings, they could not be identified publicly, which means people would not be able to acquire words referring to emotional feelings (Bedford 1956-57).

Although taken in their extreme versions, these approaches to emotions appear, as it has been shown above, to be somewhat mistaken, many theories are still built upon the emotion versus cognition distinction. Bodor, for instance, only partially rejects these views and postulates that evidence shows that people feel responsible for their emotions (Bodor 1997: 197). Brown points to the opposition of cognition and emotion noticing that "somewhere between Leibniz and Kant the mind was divided into three parts: cognition, affection, and conation" (1994: 146), and Ullmann (1957) argues that this classical trichotomy could actually be reduced to a dichotomy, that is, he claims that conation and emotion have a strong affinity and can therefore be taken together. Thus, the main division of the brain would be into cognition and affection.

Many theorists express some doubts concerning the nature of emotions. Some of the questions are, first, what is the number of emotions that should be distinguished, then, which of them, if any, should be considered universal, and, finally, should theories distinguish between emotion, feeling and affect or not. Wierzbicka, for instance, claims that "every language imposes its own classification upon human emotional experiences, and English words, such as *anger* or *sadness* are cultural artifacts of the English language, not culture free analytical tools" (1992: 456; 1995: 236). She believes emotion to be a semantic

domain and the tool she uses for the study of emotion is a semantic metalanguage, that is, a set of primitives or semantic universals, like feel, want, say, think, know, good, or bad, which, according to her, are shared by all human languages (1992: 236). This is one of the views standing in strong opposition to biological reductionism.

Finally, the question arises of the nature of the concept of emotion. According to some psychologists emotion is a mental event (Wundt, 1912/1924), according to others behavior (Watson, 1919), and still others believe they are a type of physiological activity (Wenger, 1950). More recent views on emotion open to doubt a definition of emotion based strictly on only one of those factors. Averill (1980), for instance, opposes the description of emotion as a mental feeling, for a person may be envious not realizing or even denying that. One of the most fruitful theories that have recently been applied in many problematic areas of categorization is the prototype theory first proposed by Eleanor Rosch. This model is one of two major models of concept formation developed within the domain of cognitive psychology. According to this view, "people do not encode natural concepts in terms of a set of defining features", which is claimed within the feature-based model, "but rather in terms of the best example called the prototype" (Puppel, 1996: 49). Thus, each category consists of more prototypical (sharing more attributes in common with other members) and less prototypical (sharing fewer attributes) members. They are all organized around the clearest examples of a given category called prototypes. Members of a category usually vary in the degree of family resemblance.

Another claim reported by Rosch et al. (1976) is that categories are organized hierarchically, i.e. words refer to categories which are progressively more general (a terrier is a type of a dog, which is a type of a mammal, which is a type of an animal) and that the superordinate category name is more likely to be elicited by more prototypical members of a category than by more peripheral ones. The prototype theory was applied to the domain of emotion by, among others, Fehr and Russel (1984), who reported a series of seven studies and concluded their research with a claim that, viewed from a prototype perspective, the concept of emotion has an internal structure, i.e. types of emotions can be gradually ordered from more prototypical to less prototypical examples. They also allege that the concept of emotion lacks sharp boundaries and should, therefore, be distinguished from classically defined concepts.

Functions of emotions

Except for the question of the way emotions are categorized in the human conceptual system, there is another one of whether they have any functions, and

if they do, then what these functions are. In the past, emotions were not usually believed to have functions. Darwin (1872), for instance, assumed that emotional expressions appear in the language of adults both when they are and are not of any use. James (1884) claimed emotions did not affect mechanisms that produce behavior because they were the result of this behavior. However, some European and American theorists have recently begun to ascribe functions to emotions. Oatley, for instance, in his article "Emotions: Communications to the Self and Others", alleges that the primary function of emotions is to manage the flow of attention and readiness in beings and, although not all emotions are related to goals, the primary function of emotions is connected with human plans and goals, which not always go as foreseen (Oatley, 1996: 312).

This relation of emotions to human goals and plans can be seen in the description of the nature of emotions. Oatley believes that time-limited emotions are similar to warning signals, that is, they do not inform us of what exactly has happened, but rather direct our attention. They can be signals to the self as well as to the other¹. According to the communicative theory (Oatley, 1996: 313), the foundation of emotions is simple monitoring of events which may influence our goals or plans. If the event makes the goal more likely to be achieved, the emotion is positive, while if it makes the goal less likely to be achieved or, even worse, has a destructive impact on it, the emotion is negative. Negative emotions seem to be more differentiated than the positive ones; if we are sad, we are usually prompted to relinquish our goal, if we are angry, we set up new plans in order to overcome frustration, and if we are scared, we are ready to escape.

As it has already been mentioned, time-limited emotions do not provide any specific information on what has happened, but they act like signal sounds and they activate certain modes of human cognitive system. They can be compared to an emergency vehicle's siren, which does not inform us of the exact event that has happened, but it is a sign telling us that we should pull over if we are driving a car at the moment. Similarly, emotions make us act in a certain way rather than communicate what has happened. In the light of this view phenomena such as directing anger at inappropriate people can be explained in terms of the possibility that emotions can slide across different objects.

Metaphor perception

Despite the ongoing debate on the categorization of emotions and their functions, people day after day perceive and recognize emotions as well as react emotionally to events. Studies attempting at answering these questions are not limited solely to psychology and neurology, but more and more often language is appreciated as a tool that plays an important role in solving this problem. As it

has already been mentioned, metaphor is one of the linguistic means used in verbalizing such abstract ideas as emotions, and the research of its perception and production may reveal important information about the nature of emotions and language. Since metaphor perception and production require two different approaches and are two extremely rich in findings areas under constant investigation, this paper deals only with one of them, i.e. metaphor perception. One area where perception of metaphor has been investigated is neuro-physiology.

In spite of many doubts and unanswered questions about the role the right cerebral hemisphere plays in communication, one conclusion seems to emerge from the study of patients with acquired right hemisphere lesions. In such cases communication skills can be impaired and the ability to integrate multimodal perceptual information can be lost (Jane Shields, 1991). Metaphor perception seems to be involved in this impairment. Winner and Gardner (1977) examined left hemisphere-damaged aphasic patients, right hemisphere-damaged patients, bilaterally damaged patients and a non-neurological group by presenting them with a figurative sentence and asking them to perform two tasks. One task was to match the sentence with one of four pictures (depicting literal meaning, appropriate metaphoric meaning, salient quality, and the noun included in the phrase). The second task required the patient to explain the reason for their choice. Winner and Gardner claim that the results suggest the necessity of effective interaction of the hemispheres in comprehension of figurative meaning. This is supported by the fact that although in the first task right hemisphere damaged patients were less successful than left hemisphere-damaged patients or the control group, in the second task left hemisphere-damaged patients were less successful in explaining the reason behind their choice, while right hemisphere-damaged patients were able to verbalize it using figurative language. moreover, they claim that at least some elements of metaphor processing are right hemisphere dependent.

Similar conclusions were reached by Brownell et al. (1990) in a related study. Additionally, a unique contribution of the right hemisphere to figurative language processing was noticed in the results of this experiment, i.e. the degree of semantic similarity between the target and its synonym affected patients with left hemisphere lesions only in the metaphoric condition, which could suggest that semantic information is coded differently in the left and right hemisphere. Beeman (1993) interprets these results to be a basis for a suggestion that right hemisphere may process information in a coarser fashion while left hemisphere may process information in a fine fashion (when larger receptive fields are used in processing information, the information is coded in a coarse fashion and therefore maximizes the responsivity to localizing the source of continuous

input). This would suggest that figurative language comprehension involves such a strong activation of right hemisphere that it influences left hemisphere processing.

This claim has recently been indirectly underscored by Marjorie Collins, (2002) who conducted an experiment on alternative meanings of ambiguous words. In her experiment, whose subjects were university students, Collins measured priming of alternative meanings of ambiguous words using homographs and their dominant, e.g. bark – dog, and subordinate meanings, e.g. bark – tree. Such stimulus pairs were used as related pairs in a lexical decision task. They were temporarily separated by stimulus onset asynchronies (SOAs) of 180 and 350 ms and were independently projected to the left or right visual fields (LVF or RVF). The results suggest that in general a wider range of meanings was activated in the contralateral hemisphere than in the hemisphere to which the prime was directed, regardless of the hemisphere to which the prime was projected. Thus, it confirms the importance of interhemispheric cooperation in processing of ambiguous words. Although this experiment did not address metaphor directly, the results suggest that a similar study on metaphorical expressions could bring in some evidence for Winner and Gardner's as well as Beeman's hypothesis.

Conclusions

Intriguing questions emerge from recent studies and the review of literature on the nature of emotions, their verbalization via the use of metaphor, and the role the brain has in this process. It is still not known if language is organized in the brain in the same way that linguists have described it, or if metaphor does reflect some aspects of the human conceptual system. It seems plausible to assume that if emotions are part of everyday human experience and metaphor is the dominating way in which people verbalize emotions, then metaphor appears to be part of everyday human verbal communication and therefore research on metaphor can reveal important information about human conceptual system.

Studies of metaphor comprehension in patients with right hemisphere damage and left hemisphere damage show that the right hemisphere may be responsible for understanding of metaphor. However, in the light of neurolinguistic studies, which more and more often emphasize the role of interhemispheric cooperation in linguistic processes, there appears a clear need for further research in this field. For instance, aphasiology has mostly focused on patients with left hemisphere damage and devoted little attention to those with right hemisphere damage, while although patients with right hemisphere damage may have fewer or less serious linguistic problems than those with left

hemisphere damage, studies of their linguistic competence and performance may reveal information relevant for psycho- and neurolinguistics.

Research on emotions, their verbalization via metaphor and the role the human brain plays in this process requires an interdisciplinary approach, which may seem difficult and challenging, but at the same time is crucial and necessary. And it seems that there are still many areas in which we have insufficient knowledge if we want to understand psycholinguistic and neurolinguistic processes.

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