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THE NEUROPSYCHOLOGY OF METAPHORS IN PATIENTS AWAKENED FROM POST-TRAUMATIC COMA

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SUMMARY

Background:

Metaphor simply is defined as a verbal construct with two referents: one literal, based on the ordinary, concrete meanings of the word or words involved, and the other metaphorical, that is one derived from an implicit analogy between the literal referent and some other phenomenon, usually an abstraction that is implied, but not named. The aim of this paper is a description of the neuropsychology of metaphors in patients awakened from post-traumatic coma.

**Material/
Methods:**

A group of 34 patients awakened from post-traumatic coma and treated at the Reintegrative and Teaching Centre of the Polish Neuropsychological Society, Poland during the period 2017-2019 participated in this study. This group included 15 women and 17 men, with an average age of 31.2 ± 8.72 years; as a group, the women were somewhat older (32.6 ± 9.79 vs. 31.1 ± 9.18). We recorded the patients' utterances with the use of video recordings of open-ended conversations, and made occasional efforts to introduce proverbs, idioms, and other metaphors into their conversation, but this was done on an impromptu basis.

Results:

The analysis of recordings of 100 randomly selected statements obtained from each patient revealed the presence of 4 types of errors: (1) *non-comprehension*, i.e. the listener's inability to comprehend the meaning of the metaphor used by the speaker, as indicated by the lack of an adequate response, an expression of puzzlement, or a question as to the meaning of the metaphor used by the speaker; (2) *concretization*, which occurs when the listener reacts to the literal meaning of the word, phrase, or sentence, rather than its metaphorical referent; (3) *misapplication*, when the speaker uses a familiar metaphor in an inappropriate context; (4) the use of *incomprehensible or bizarre metaphors* by the speaker, so that the intended meaning is difficult or impossible for the listener to ascertain. On many occasions, however, the gist of the metaphor emerged at some later point in the discourse, despite the surface problems.

Conclusions:

It was found that the TBI patients we studied showed a marked tendency in spontaneous conversation to concretize or misunderstand the metaphors used by others, and to use inappropriate or bizarre metaphors in their own speech. On many occasions, however, the gist of the metaphor emerged at some later point in the discourse, despite the surface problems.

Key words: comprehension of metaphors, use of metaphors, transferential meaning, abstract meaning

INTRODUCTION

For present purposes, without for the moment entering into larger theoretical disputes, we shall define metaphor simply as a verbal construct with two referents: one literal, based on the ordinary, concrete meanings of the word or words involved, and the other metaphorical, that is one derived from an implicit analogy between the literal referent and some other phenomenon, usually an abstraction that is implied, but not named (Pąchalska & MacQueen 2003).

The transferential and abstract meaning requires a properly developed mental state. Such a mental state develops from the unconscious to consciousness and pulsates during individual intellectual operations (Pąchalska, MacQueen and Brown 2012a; Pąchalska, Góral-Póćrola, Mueller et al. 2017; Pąchalska 2019). The course of mental state development follows a serial order meaning that this state occurs:

1. *in the space of brain structures*, where it can develop from covert processes to the level of the threshold of consciousness (an ascending mental state) and disappear (the disappearance of the mental state itself) or exceed this threshold (the development of the mental state) and rise even higher to the appearance of full consciousness and conscious cognition (the culmination of the mental state);
2. *in time*, in the form of pulsating individual mental states, which ensures the renewal of these states. This allows you to become more aware of reality. The time it takes to become aware of this reality may last a relatively short time for healthy people with a properly functioning brain, while for people with brain damage due to the destabilization of neural networks this may be more or less slow or may accelerate, which in each case will lead to disorders within cognitive and emotional processes (Pąchalska, Góral-Póćrola, Brown et al. 2015; Pąchalska 2019).

This approach to the essence of the mental state makes it possible to understand the phenomenon of developing (T1) and renewing (T2) this state in time (cf. Fig. 1) and the birth of the minimal working self, which was described in more detail by Pąchalska, Kaczmarek & Bednarek (2020).

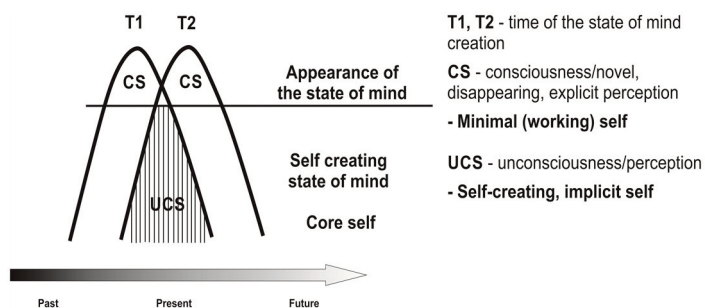


Fig. 1. Developing (T1) and renewing (T2) the mental state in time: the birth of the minimal (working) self

Source: Pąchalska, Kaczmarek & Bednarek 2020, modified

In working memory, images are reproduced in subsequent mental states in the order of memory, i.e., in relation to their resemblance to the coming state, and thus to the possibility of renewing the mental state. In the current state of mind, there are images closer to the perception that takes place, i.e., images from the working memory buffer that have almost reached the character of renewed perception. The brain-mind state in T1 is replaced by the overlapping state T2 before T1 ends in time, i.e., before the next phase occurs. This explains the reoccurrence of the early phases in T1, related to the condition of the body (body and brain), a person's individuality, i.e., Self, character, disposition, capacity of working memory buffers, long-term memory resources and experience, and the durability of basic beliefs, values and personality (see also: Pąchalska, MacQueen and Brown 2012b). Later phases disappear when the whole process of realizing reality is completed to make room for new perceptions. The activity of earlier phases of the mental state in the process of the overlapping of individual phases explains the sense of self continuity in time. It should be emphasized that the early stages of mental state development are components that incorporate later states that are more susceptible to environmental influences. At the same time, the repetition of earlier phases is closely connected with the feeling of a reality that exists (Pąchalska, MacQueen and Brown 2012a).

This means that in the process of creating consciousness, one state of mind is replaced by another in a split second, which makes the apparent change replace the previous states of mind by successive states. This overlap of individual states creates a sense of continuity, while their mutual substitution creates a sense of change. It is worth emphasizing that the process of becoming aware of reality may vary depending on the needs, attitude, emotional state and cognitive processes of a person (Pąchalska 2019), as well as the criterion features of the objects with which a given person interacts, as well as environmental conditions.

Mental states do not constitute a cumulative whole created as a result of separate processes occurring on three levels of microgeny (drives and needs, emotional and cognitive processes), but recreate the course of object (perception) formation in the mind (cf. Pąchalska, Kaczmarek, Kropotov 2014). And it is the process of creating an object representation that organizes the process of self formation in microgenesis.

Understanding a metaphor

So in order to understand a metaphor we begin with its literal referent, in order to determine which of its qualities can be used to reveal the essence of the metaphorical referent. If a poet says, "My love is like a red, red rose," we are entitled, indeed required, to ask what qualities a rose has that can illuminate the qualities of the poet's love: loveliness, presumably, but also, perhaps, evanescence and the presence of thorns¹.

¹ In literary analysis one often asks, "How far (or deep) does this metaphor go?" At first glance, it would seem perverse to add to the metaphor such qualities as "green," "red," and "grows better when one puts manure on the roots." What happens, though, if we read "green" as a symbol for a "vegetative life," "red" for "blood," and then read "fertilizing the roots with manure" psychoanalytically?

The basic question to be addressed by the present study is, however, not the nature of the cosmos, or of the state, but rather the process by which the mind/brain shifts from the literal, concrete meaning of a word, phrase, or sentence to another, transferential or abstract meaning. However, rather than starting from the problem of the abstract meaning we might do as well to explore first the question of what is really meant by “literal.”

Literalness

In contemporary Polish, the word *dostownie* [‘literally’] has become one of the most overused words in the language. It is very common to hear in ordinary conversation sentences like the following:

*We didn’t have time for breakfast that morning and by lunchtime we were **literally** starving.* [1]

What function does the word “literally” serve in this sentence? Missing breakfast one day is not enough to cause even serious malnutrition, let alone starvation, so the speaker’s implicit claim that death was imminent is clearly an exaggeration. Indeed, there is little danger that the interlocutor will understand the sentence in any other way than as an example of hyperbole. If the literal meaning of “starving” is “dying by malnutrition,” and if a human being is not likely to die of starvation after missing one breakfast, then there is only one reasonable way to understand “We were starving”: namely, as a rewrite for “We were very hungry.” The move is not a difficult one for either the speaker or the interlocutor, since hyperbole is one of the most common figures of speech: after all, we all use hyperboles of this sort a million times a day...

This common rhetorical gambit would seem to be directly and deliberately thwarted by the insertion of the modifying adverb “literally.” The literal meaning of a word or phrase is generally understood to be its most basic meaning, often etymologically motivated; thus the English “literal” comes from the Latin word *littera* ‘letter,’ which would seem to imply that the literal meaning is the one derived from the letters. Since letters do not have meanings, but rather only a somewhat tenuous relationship with phonemes, which also by definition do not have meanings, then the etymology of “literal” does not get us very far. The Polish word *dostownie*, on the other hand, can be broken down into three morphemes:

- *do-* ‘to,’ a preposition frequently used as a verb or adjective prefix;
- *słow-*, from *słowo* ‘word’;
- *-nie*, a suffix used in word formation to make adjectives into adverbs (analogous to the English “-ly”).

Thus a “literal” reading of *dostownie* would be “to-word-ly,” or, if we Latinize it, “adverbally.” Like the English “literal,” until recently the quality of being *dostowny* was predicated primarily in translations from one language to another. Literal translations replace one word in the original with a word of the same or very similar meaning in the target language, a procedure which not infrequently yields

absurd or incomprehensible results. For example, if we attempt to translate literally into English the common Polish sentence,

Przykro mi, [2]

the result is

Unpleasant to me. [3]

In a similar way, the familiar Italian sentence,

Mi dispiace, [4]

has the literal sense

To me it is displeasing, [5]

which seems quite close to the Polish *przykro mi*. What the literal translation obscures, however, is how [2] and [4] are actually used in Polish and Italian respectively: that is, both sentences are used to express an apology. Thus for all practical purposes both [2] and [4] should be translated into English as

I'm sorry, [6]

something the literal translations in [3] and [5] obscure.

A literal translation, then, is one that makes no effort to interpret the text, but merely renders the words and grammatical structures from the original language into the nearest equivalent in the target language. The pitfalls of literal translation, which very seldom leads to an accurate rendering of the meaning of the original, are generally well known and need not be elaborated on here. For the present purposes, the significant point is that literalness is associated with an attention to smaller linguistic units, especially words, without particular regard to the meaning or intention of the utterance as a whole. In that broader sense, literalness pertains not only to translations from one language to another, but also to such rhetorical figures as hyperbole (as in [1] above) and metaphor. The irony, not to say absurdity of [1] consists in the fact that:

- the expression “we were starving” is clearly hyperbolic and can only be understood in that way (as a literal statement of fact it is very unlikely to be true);
- the word “literally” explicitly denies that the statement is hyperbolic.

Both English “literally” and Polish *dostownie* are thus used analogously, if not always logically or properly, to suggest that the speaker is not employing a rhetorical device, which in turn makes the statement seem more credible. Of course, “literally” can also serve to resolve a possible ambiguity. If, for example, in reference to the final scene of an intermediate episode in a serial, one says,

It was a cliffhanger, [7]

then one is using a metaphor that refers to a narrative device often used in adventure films, when one of the characters is left hanging from a cliff at the end of one of the episodes, leaving the audience (or reader) anxious to see (or hear, or read) the next episode in order to find out what happens next. If, however, one says,

It was literally a cliffhanger, [8]

then one is saying that this should not be read as a metaphor. Thus [7] can properly be used of any ending that leaves the audience in suspense, while [8] should only be used when at the end of the episode in question, one of the characters is actually dangling from a cliff.

Indeed, if we were to collect sentences in which “literally” is used (or misused), the great majority of instances fall into one of the two categories already mentioned: hyperbole and metaphor. When one hears,

I was literally scared to death, [9]

We are literally swamped with work, [10]

He is literally out of his mind, [11]

There are literally a million reasons why I can't agree with that statement, [12]

the only possible understanding of “literally” is, as already suggested, the desire to make a hyperbolic or metaphorical utterance less rhetorical (by explicitly denying that a figure of speech is being used), and thus more credible. Of these four examples, [9] and [12] are clearly hyperboles, since they involve obvious exaggerations that remain obvious even when “literally” is added, while [10] and [11] are metaphors. In the latter case, the word “literally” should mean that the sentence is not a metaphor, and thus means exactly what it says – which leads to an absurdity. Sentence [10], for example, on face value states that the first person plural subjects are ‘standing up’ to their necks in work; sentence [11] would have us believe that the subject of the sentence is present somewhere else, and not in his mind, where he presumably belongs.

Thus the literal meaning of [10] refers to a swamp, i.e., a place that is neither a body of water nor an expanse of dry land, but something in between, usually teeming with insects, snakes, alligators, and other creatures most would prefer not to meet. Swamps have the additional property that they are very difficult to walk in or through, and the unwary pedestrian half walks, half swims, and not infrequently drowns. To be “swamped,” then, would mean metaphorically to have more of something (in this case, work) than one can possibly deal with, and indeed to be so inundated that movement is difficult or impossible. Taking the metaphor still further, being “swamped” may cause a person to flounder and

thrash, as a person does after stepping into the sands and muds of a swamp, and perhaps to succumb to panic.

At this point, someone may object that the word “swamped” is very commonly used in the same sense in which it is used in [10], while as a verb it is rarely if ever used in any other sense. This brings up an important point about metaphors, which is that they have a certain lifespan (Bowdle & Gentner 2005). When a metaphor is used very often over a long period of time, it does indeed cease to have metaphorical force, and the previous metaphorical meaning becomes a literal meaning. The English adjective “exhausted,” for example, is derived from the Latin verb *exhauro*, which means “to drink completely, to drain.” It can still be used of the complete consumption of a commodity, as when one says, for example,

Our supplies of grain are exhausted, [13]

but this is increasingly uncommon in ordinary speech; rather, “exhausted” is most often used in the sense of “very tired.” This was of course originally a metaphor, being “drained of strength,” as an empty glass has been drained of wine, but in current usage the meaning “very tired” is no longer felt as a metaphor, but as the ordinary meaning of the word “exhausted.” In short, over time and with frequent repetition, metaphorical meanings often become literal.

The study of metaphors

At various periods in the history of thought, including the history of thinking about languages, metaphors have sometimes been elevated to a position of primary importance, and sometimes relegated to the margins of rhetorical or literary analysis (MacQueen, Pąchalska, Tłokiński et al. 2004). In the rhetorical-poetical tradition, the metaphor is a figure of speech, in which a word, a phrase or an entire sentence is used to make an “implied comparison of dissimilar things” (Hodges, Whitten & Webb 1986:227). In this and similar taxonomies, if the comparison is not implied, but explicit, then the figure in question is not a metaphor, but a simile; if the things compared are not truly dissimilar (that is, if the point is to demonstrate an inner sameness in spite of specious differences between two things), then the figure is an analogy. As is often the case, however, the neatness of these categories does not bear up under the pressures of actual practice.

Precisely when conceived as a “figure of speech,” metaphors are characteristic features of ornate, erudite speech, used especially by poets and orators to escape from the prosaic, directly referential character of ordinary language. The more poetic language becomes metaphorical, the more it seems by the same token rhetorical, which may cause it to become more or less interesting, depending on the tastes of the reader or critic. As a feature of artistic, figurative language, then, metaphor remained until the mid-1980s a topic of only marginal interest to linguists and psychologists, whose professional academic interests have tended to focus on the spontaneous and artless utterances of ordinary peo-

ple, rather than the verbal acrobatics of literary artists. The psychoanalytic movement was the major exception to this general neglect of metaphor in psychology, but here the psychoanalyst's tendency to interpret all texts metaphorically has been one of the major contributing factors to the familiar complaint that psychoanalytical hypotheses are not falsifiable, and thus *ipso facto* not truly scientific. For perhaps obvious reasons, metaphorical thinking was not a topic of interest in behaviorist psychology; cognitivism, in turn, owes much to the development of transformational-generative grammar, in which metaphors are of no particular interest. The utterances of persons who mean something other than what they say is an obstacle (or even an embarrassment) to serious scientific study, whether by behaviorists or cognitivists; they are very difficult to study by means of carefully controlled experiments.

Interestingly enough, the status of metaphor over the last two decades or so has been quite different in semantic linguistics. In 1980, George Lakoff and Mark Johnson published their landmark study, entitled *Metaphors we live by* (Lakoff & Johnson 1980), in which they argued that all meaning in language is essentially derived from a process of metaphorization. Later, in independent publications, both authors attempted to demonstrate how metaphors, which from the standpoint of the theory of syntax are noise in the surface structure of an utterance, are the key to semantics (Lakoff 1987, Johnson 1987). The names of things become nouns when the name of a particular person, place or thing becomes the name of all persons, places, or things belonging to a particular category (as the proper name Caesar became the German *Kaiser* or Russian *Tsar*), while the category in turn can be defined as the set of all things to which a given metaphor pertains. In other words, metaphor is what makes language possible.

In any given language there exists a very small core of primitive morphemes that correspond in an arbitrary and direct fashion to specific things. The process of assigning meaning to sets of phonemes in any given language is lost in the mists of prehistory and cannot be retraced, unless the language in question is derived from another, yet older, historical language, as French, Spanish and Italian are derived from Latin. Most of the actual working vocabulary of a language is constructed by successive extension of the meanings of these morphemes, and the basic motor driving this extension process is metaphor. The result of this is that almost every word in a given language, and thus *a fortiori* every utterance constructed using those words, contains an element of metaphor, at least historically. The word "historically" is itself an example of this process. Both "story" and "history" are derived from the same Latin word, *historia*, which in turn is borrowed directly from the Greek *historia*. This noun, in turn, is related to the verb *historeuo* 'enquire,' and both the noun and the verb can be traced back to a primitive root that probably meant "asking questions." The ancient Greek historian was a writer of stories, who, instead of using traditional tales for his material, went about asking people about the events which they had witnessed. Thus "history" in the sense of "the past" is a transferential meaning, though the original literal meaning has long since been lost from view.

No small part of the difficulty in defining and describing metaphors is the fact that the basic phenomenon, i.e., the shift in planes of references from the literal to transference, occurs on different levels of linguistic structures. To this point, we have been assuming that a metaphor is a word that is being used in a given context to shift the plane of reference. If we say, however,

That's still up in the air, [14]

and we are not referring to an airplane, a bird, or a hot-air balloon, but rather to a situation that is unclear or a decision that has not yet been made, then the metaphor does not lie in a single word, but rather in the phrase as a whole, “up in the air.” Metaphors can also be expressed in entire sentences, as for example in a metaphor often used by the father of the second author of the present study, who was a chemical engineer employed by a major petroleum company, frequently sent to consult on pipeline and refinery projects when something had gone wrong. On a sign over his desk callers could read the following sentence:

When you're up to your neck in alligators, it's hard to remember that your original purpose was to drain the swamp. [15]

The metaphor here is not to be found in any single word or even phrase, but in the gist of the entire sentence. The message of [15], if expressed without resort to metaphors or hyperboles, would be,

When one is faced with numerous and difficult problems, one often loses sight of the overall purpose towards which one should be working. [16]

The purpose of the metaphor in [15] is to make the same point as [16], while using more concrete language, where problems become “alligators,” implementing improvements becomes “draining a swamp,” and the presence of excessive problems is being “up to one’s neck” in something. The vivid concreteness of the literal referents not only makes the sentence easier to understand, but gives it a humorous effect, which causes it to be retained in the memory and reduces the receiver’s resistance to the message. Arguably, then, the words “alligator” and “swamp” and/or the phrases “to be up to one’ neck” and “to drain a swamp” can each be analyzed as metaphors, and yet the whole sentence has a metaphorical character that does not consist only in the sum of all these metaphorical elements.

Metaphor and analogy

In cognitivism, which is heavily influenced by the contemporary theory of information processing, analogy and metaphor are understood as the cognitive and linguistic aspects respectively of the same mental process, called “mapping between domains” (Bowdle & Gentner 2005). If Lakoff and Johnson are correct

that the formation of metaphors is the basis of language, at least in its semantic aspects, then mapping between domains is a characteristic feature of human thought (Rohrer 1995). Chimpanzees can learn a large number of words to designate objects, persons, emotional states, and even particular features of differing objects (provided that they are common and concrete), but they do not use or understand metaphors (Kaczmarek 2003). Computers can be programmed to process metaphors, but only when they are given an algorithm to decode them: that is, the metaphor must be converted to a literal statement in order to be interpreted. When a metaphorical meaning or a word or phrase has achieved lexical status, the computer can evaluate it as a possible reading for a given lemma, as it considers alternative meanings of any words in a natural language. It is not clear, however, that the human brain does the same thing, especially when the metaphor is original, complex, creative, poetic.

It is, of course, the context in which an utterance is made that ordinarily decides whether the speaker intends for the literal meaning to refer to some other plane of meaning. Thus the ability of both speaker and listener to make the metaphorical shift at the appropriate moment is an essential element of the pragmatic competence of both of them. Devising a poetic or rhetorical metaphor can be an intellectual *tour de force*, but even the “metaphors we live by” require mental operations we scarcely understand given the present state of our knowledge about the brain. Existing models of brain work can explain, at least to a certain level of plausibility, how the sensory and motor functions that begin and end (respectively) in the peripheral nervous system are mapped to the regions just in front of and just behind the fissure of Roland. Neurocybernetic models are constantly devised to explain how the basic functions of language (speaking, comprehending, writing and reading) are also mapped to the brain, though these solutions are less satisfactory (Pachalska 2003), for a variety of reasons. None of these models, however, can even begin to explain the “mapping between domains” that takes place in the case of thinking by analogy. Rather, the simplifying assumption is made that a natural language is a somewhat imperfect but usable computer language, in which a system of signs is used to represent specific objects and functions, and the variations that occur in the meanings of words are noise in the system, resulting from the residue left behind by the messy biological processes underlying the evolution of a given language. Analogies arise because the evolving brain is governed by the economy of nature, which constantly applies the same laws to different phenomena and processes. Metaphors, then, presumably result because a natural language is insufficiently flexible to devise new lexemes that can be used to designate what is discovered by analogy, and must rely on a sort of extrapolation from what already exists in the language to that which needs to be named.

When the very existence of analogy and metaphor as such call into question the basic assumptions of the paradigm used to explain the mental processes of thinking and speaking, the defenders of that paradigm react in generally predictable ways. Analogy is called “mapping between domains,” without much effort to explain the putative neural mechanisms by which such a thing is possible.

The concept of metaphor is reduced to the level of idioms and proverbs, which are essentially elements of the lexicon of a given language, available to anyone who speaks that language well. Thus a search of the neuropsychological subject literature for a discussion of the problem we have raised here will find very little beyond studies of how patients with brain damage interpret proverbs. That is an interesting topic in its own right, of course, but the category “proverb” is not co-extensive with the category “metaphor,” so even the most thorough studies of proverb interpretation cannot pass for studies on how the brain operates with metaphors.

Metaphors, idioms and proverbs

An idiom is an expression in a given language whose meaning cannot be extracted directly from the literal sense of the individual words that compose it, but is generally sensible to, and commonly used by, speakers of a given language. For example, the English sentence

I don't give a damn, [17]

will be understood by anyone who knows English well to mean that speaker is completely indifferent to the situation identified in the context. It would be very difficult to explain, however, what the literal meaning of [17] is. The mild expletive “damn” is clearly being used as a noun here, but how is that possible, and what would it mean, given the dictionary definition of the word “damn”? Depending on the situation, it can be replaced by other words, either stronger or milder, such as

I don't give a shit, [18]

or

I don't give a hoot, [19]

respectively, which only serve to demonstrate that on the literal level there is not much sense to be made of all this. Nor does it solve the problem to suggest that the “damn” in [17], the “shit” in [18], or the “hoot” in [19] are metaphors. Metaphors for what? The meaning of the idiom is sanctioned by convention, just as the meanings of individual words are sanctioned, but the whole point of an idiom is that its conventional meaning cannot be derived from the semantic or syntactical structures used to form it.

Metaphors and proverbs

Proverbs are similar to idioms, differing primarily in the degree of elaboration. Idioms are – mostly – words or phrases, while proverbs are – mostly – complete sentences, repeated in a canonical form. Like idioms, proverbs are often, but not always metaphorical, or, perhaps more strictly, analogical. The fixedness of the form is essential here. One uses the proverb

A bird in the hand is worth two in the bush. [20]

to say something like this:

It is better to stay with what one already has, than to risk ending up with nothing in order to pursue something that perhaps cannot be attained. [21]

One could as easily say,

A fish in the creel is better than two fish in the stream, [22]

and the metaphor would be just as apt, if not more so, and perhaps better understood on the literal level than [20]; but tradition sanctions the “bird in the hand,” so [20] is a proverb, and [22] is an original metaphor.

The Polish equivalent of this proverb (translated literally) reads as follows:

Better to have a sparrow in the hand than 100 pigeons on the roof. [23]

Sentence [23] seems close enough in its literal meaning to [20] to justify their use as equivalents in translations from one language to the other, since otherwise the reader who does not know Polish is likely to miss the point of [23]. This brings up an important aspect of proverbs, which is that the canonical forms are cultural artifacts, specific to a given language but often similar to proverbs occurring in other languages. In some cases, the existence of similar proverbs in Polish and English results from their common Latin ancestor, though with adaptations. One says in English, for example,

Clothes make the man, [24]

which is based on the Latin proverb,

Vestis virum reddit. [25]

In the Latin original, however, the verb *reddit* has more the sense of “reflect” than “make” the man. In the Polish version, interestingly, the exact opposite is stated. Translated literally into English, the Polish proverb would read,

It's not the garment that adorns a man. [26]

If it were not for the negation, the proverb would be almost exactly the same as [24] and [25], which suggests that we are dealing with the “same” proverb, but negated.

For the present purposes, however, the most important observation is that neither [25], nor either of the two translations in [24] and [26], is properly a metaphor. The issue of dress is not being used as a sign of something else: the subject, object and verb of the three sentences are being used in their ordinary, literal meanings.

To sum up: although the categories of metaphor, idiom, and proverb have considerable overlap, they are not co-extensive: not all proverbs are metaphors, not all metaphors are proverbs, and the same applies to idioms.

MATERIAL AND METHODS

A group of 34 patients awakened from post-traumatic coma and treated at the Reintegrative and Teaching Centre of the Polish Neuropsychological Society, Poland during the period 2017-2019 participated in this study. This group included 15 women and 17 men, with an average age of 31.2 ± 8.72 years; as a group, the women were somewhat older (32.6 ± 9.79 vs. 31.1 ± 9.18). As usual in a TBI population, then, these were mostly young people, with a predominance of young males. The material was gathered during monthly sessions of the Academy of Life program, conducted by the present authors at both of these institutions (described in detail in Pachalska 2003). All the patients participating in this ambulatory program first complete a program of intensive in-patient rehabilitation for an average of two months. Afterwards, they attend meetings of the Academy on an out-patient basis, usually in the company of at least one caregiver. These meetings are partly structured, and partly left open to respond flexibly to the needs and desires of the patients.

We did not include in this group patients with deficits in speech or mentation (i.e. post-traumatic aphasia or dementia) that would make it difficult to assess their comprehension and use of metaphors. Further neuropsychological screening was done as part of the routine testing of severe TBI patients participating in the Academy of Life program (see also: MacQueen, Pachalska, Tłokiński et al. 2004)

The results of the neuropsychological standardized test, with an overall profile of the group, are given in Table 1.

As can be seen from the results presented in Table 1, these were not patients with severe cognitive deficits. None of the scores from the WAIS-R or the WMS-R were in the impaired range according to Polish norms. The absence of pathological scores on the BNT and the FAST indicate that language functions, at least on the level measured by these tests, were unimpaired. Two patients had MMSE scores just below the lower limit of normal, i.e., within the range referred to as "mild cognitive impairment." Although there were certainly some weaknesses shown on the Trail-Making Tests, both A and B, generally thought to be an indication of executive dysfunction, these were not extreme. On the Beck Depression Inventory, 27 of the patients (13 women, 14 men) showed signs of depression, but none were severely depressed.

Table 1. The results of standard neuropsychological tests.

Instrument	Max. possible/ Norm	Min.	Max.	Ave.	SD
WAIS – R					
Full Scale IQ	100	88	97	92.3	2.70
Verbal IQ	100	91	103	97.6	4.02
Performance IQ	100	85	90	86.8	1.61
WMS – R					
Immediate logical memory	24	17	22	19.3	1.60
Delayed logical memory	24	14	21	17.4	2.02
Immediate visual recall	41	27	39	35.5	3.15
Delayed visual recall	41	23	35	30.1	2.56
Language functions					
BNT (Polish Version)	60	53	58	56.3	1.54
FAST	30	27	30	28.9	1.00
Global cognitive status					
MMSE	30	25	29	26.3	1.37
Trail-Making Test					
A	45 sec.	35	51	41.1	4.89
B	45 sec.	84	101	91.0	5.44
Other tests					
Beck Depression Inventory	30	17	27	22.7	2.83

We recorded the patient’s utterances with the use of video recordings of open-ended conversations, and made occasional efforts to introduce proverbs, idioms, and other metaphors into their conversation, but this was done on an impromptu basis. The patients were not asked explicitly to explain or interpret any utterance identified as being a metaphor or proverb. In some cases the material comes from conversations which the researcher overheard, but to which not an active participant. The examples of the particular error referred to above as “misapplication of metaphors” were encountered rather often in the speech of healthy individuals conversing with the patients, especially in older age. The transcribed material from the recordings has been translated idiomatically from Polish to English. When possible, metaphors and idioms used in Polish have been translated with English equivalents; in some cases, a more literal translation has been used, with an accompanying commentary to explain how the metaphor in question is ordinarily used in Polish.

All participating patients were informed of the fact that they were being taped, and of the purpose of the research. All signed informed consent forms, and the research project was approved by the local bio-ethics committee. In what follows, the patients and other interlocutors are identified only by a random letter-number combination.

RESULTS

The analysis of the recordings of 100 randomly selected statements obtained from the recorded material of each patient revealed the presence of 4 types of errors:

Table 2. The most common errors

Type of the error (out of 100 randomly selected statements)	M		F	
	n	%	n	%
Non-comprehension	8	80.0	5	50.0
Concretization	71	71.0	72	72.0
Misapplication	12	12.0	13	13.0
Incomprehensible or bizarre metaphors	9	9.0	10	10.0

1. *non-comprehension*, i.e., the listener’s inability to comprehend the meaning of a metaphor used by the speaker, as indicated by the lack of an adequate response, an expression of puzzlement, or a question as to the meaning of the metaphor used by the speaker;
2. *concretization*, which occurs when the listener reacts to the literal meaning of the word, phrase, or sentence, rather than its metaphorical referent;
3. *misapplication*, when the speaker uses a familiar metaphor in an inappropriate context;
4. *use of incomprehensible or bizarre metaphors* by the speaker, so that the intended meaning is difficult or impossible for the listener to ascertain. On many occasions, however, the gist of the metaphor emerged at some later point in the discourse, despite the surface problems.

It should be pointed out that the most common errors involved concretization, with misapplied metaphors coming in a distant second, and non-comprehension and bizarre metaphors an even more distant third (see: Table 2).

For the present purposes, however, in our opinion detailed statistical analysis of this material would be of dubious value; rather, the reader will find below several examples of each kind of error in handling metaphors, selected from among many.

Concretization

Example 1

This conversation took place between two of the TBI patients. Patient B2 (male, age 33, TBI resulting from an assault, diagnosed with frontal syndrome) had been complaining about the quality of the food in the hospital cafeteria, the responsiveness of personnel to his requests for attention, the failure of medical personnel to prescribe the drugs he regarded as necessary, the rare and short visits of his family, etc. etc. etc. Patient B1, his roommate, was recovering from a knee operation.

B1. *Well, you certainly are poisoning today.* [27]

B2. *Me? No, it’s my wife that’s poisoning. She puts chemicals in my food to poison me. Rat poison. Arsenic. Or cyanide.*

Then I have a belly ache. [28]

In [27], B1 uses a very common Polish metaphor, “to poison” in the sense “to complain incessantly,” perhaps most nearly equivalent to the colloquial English

use of “bitch” as a verb. B2 fails to pick up the metaphor, however, and responds to [27] as though he had been accused of poisoning someone. This brings B1 up speechless, and the conversation does not continue.

Example 2

As above, this conversation also involved two men, both TBI patients. D2 (age 22, TBI after an automobile accident with multiple injuries) was complaining that the orthopedic apparatus he had received the previous day was not of the best quality. D1 is obviously weary of the situation; he is reading a book and only half listening.

D1. *Well, I always say, don't look a gift horse in the mouth.* [29]

D2. *I don't know anything about horses, but I know a horse doesn't like it much when you look at its teeth. Horses don't use mouthwash and their breath stinks. But there's no law against that. They're not like camels, they won't spit on you. When you buy a horse you have to look him over. It's just good business. But if the trader is a bad person, the horse can feel his bad intentions and kick him.* [30]

In [30], it is particularly interesting that D2, though he certainly interprets the proverb very concretely, later shows some indications (talking about “looking over” a horse that one intends to buy) that at some level of consciousness he has grasped the point D1 was trying to make in [29], and at least indirectly tries to defend himself.

Example 3

An elderly female (C1) has been visited at the health resort by her granddaughter (C2) and her husband (C3). C2 had arrived earlier and was sitting with C1 waiting for C3 to arrive. When almost an hour had passed, and C2 was becoming anxious, C3 finally walked into the room, looking very upset.

C2. *Why such a sad face?* [31]

C3. *I was in a hurry to get here and the cops pulled me over for speeding. I had to pay a 500 zloty fine!* [32]

C2. *Oh, well... The wind always blows in a poor man's face.* [33]

C1. *Not in my face, it doesn't! Oh, no! I always wear glasses so the wind never bothers me.* [34]

The proverb used by C2 in 33 is a common Polish expression, intended to mean that when one is poor, nothing ever goes quite as it should. C1's interjection indicates that she has understood the expression literally. At the same time, she is clearly agitated by the situation, which she is trying to understand. Neither C2 nor C3 were able to understand why C1 had said what she said; later, as they left the health resort, they fell into a quarrel over C3's remark that “Grandma is sort of out of it, isn't she?”

Example 4

An elderly man (E1) has gone for a walk with his wife (E2). It has begun to rain, and his wife pulls out a flowery pink umbrella. She gestures for him to join her under the umbrella.

- E1. No way am I going to be seen walking under a pink umbrella!
What, do you want everyone to say that I'm queer or something?!* [35]
- E2. Now that's a lot of rain from such a little cloud.* [36]
- E1. Hey, that cloud's not so small and you're going to get very wet.
So I'll just put up the hood on my jacket.* [37]

The metaphor in [36] is meant to suggest that E1's reaction is out of proportion to the stimulus. However, in [37] E2 takes the reference to the cloud literally, looks up at the sky and comes to the conclusion that it is going to rain very hard. Still, he does not want to take shelter under the pink umbrella and finds another solution that will not, in his view, compromise his masculinity.

Misapplied metaphors

Example 5

Patient A1 (male, age 24 at present, 19 at the time of his accident, very severe injuries), accompanied by his mother (A2), has been watching a film entitled *Extraordinary people*, shown to patients in therapy. The film (made by the first and second authors of the present study) is intended to evoke emotion, and indeed A1 has begun to weep.

- A2. Well, I'm glad to see you don't have a heart of stone after all.* [38]
- A1. Yes! A human being **has a heart**. A heavy **heart**. I have a **heart of stone**. **Yes!*** [39]

Patient A1 suffered bilateral damage with considerable loss of tissue, especially in the right posterior region of the brain. A characteristic feature of his speech is an idiosyncratic mixture of Polish and English (in [39], the words spoken in English are shown in boldface), with frequent jumps from one language to the other and some very peculiar mannerisms, resulting in part from a contamination of the two languages, and in part from a severe attention deficit. However, his performance on intelligence tests is within the normal range, especially if the examiner accepts correct answers regardless of the language used. For example, on the Boston Naming Test he correctly identified 57 of the 60 prompts, of which 40 answers were in English and 17 in Polish. Despite many efforts to analyze these results we could find no regularity regarding the choice of language.

This patient generally has rather flat affect, so his mother is pleasantly surprised to see that he has been deeply moved by the film he had been watching. The patient actually catches the gist of the metaphor in [38], but turns the literal meaning around in a very interesting way. He uses a metaphor in Polish (the

same as in English), according to which “having a heavy heart” is equated with feeling sadness, then connects “heavy” with stone. The association is logical enough on its face, even though the metaphor of “heart of stone” refers in both languages rather to the hardness and coldness of a heart that feels no emotion (note, however, that both “hardness” and “coldness” of the heart are in turn metaphors for flat affect).

Example 6

Patient R1 (male, age 25) is talking with his attending physician (R2).

R2. Are you exercising with the physiotherapist at home? [40]

R1. No, I quit! Because lately, he was really pouring it on...

Holy cow!... wore me out so much he ripped my guts out, all my muscles were aching... sweat was pouring... holy cow!... like, out of the rain and under the drainpipe. [41]

In [41] patient R1 has used two common Polish metaphors, but neither of them is used correctly, which in fact baffled R2 completely. “To rip out someone’s guts” normally means to attack someone verbally; and is usually used to complain that one has been the object of unwarranted verbal abuse. R1 seems to mean here that his physiotherapist has “ripped his guts out” by overworking him. The expression “out of the rain and under the drainpipe,” on the other hand, is generally equivalent to the English idiom “out of the frying pan and into the fire”: that is, one has escaped from an unpleasant situation at the cost of falling into another unpleasant situation that may be even worse. R1 has used it, however, as a hyperbolic expression to reinforce the idea that he had been sweating a lot during kinesitherapy.

The mild expletive here rendered “Holy cow!” is the Polish *kurde*, an interjection that belongs to the same semantic class as the American English *darn*, *heck*, or *shoot*, that is to say, essentially meaningless words that are phonetically very similar to words that would ordinarily be considered obscene (see: Pąchalska & MacQueen 2003). Its use is considered indicative of a relatively low social status.

Lack of comprehension

Example 7

The sister of female patient T1 (age 24, TBI after an automobile accident) has changed colleges and moved to another city, complaining that her parents are so busy caring for T1 that they have no time for her. Now T1 is talking with her mother (T2), who uses a conventional Polish proverb to suggest that perhaps it is just as well that the sister has left.

T2. If the old lady gets off the wagon, the horses will have an easier pull. [42]

T1. Well, simply, how to put it? The horses run their own way and no one's leading them, where they're supposed to go. But there's a risk involved, because the horses are needed in a particular place, and they've run off, with no supervision. The owner should watch out or he'll lose his horses. What the owner needs is an old lady, so he'd better take care of her! From basic needs to higher and higher ones. [43]

The metaphor used by T2 in [42] is very compact in Polish (only 5 words) and is not always well understood even by native speakers. The word *baba*, here translated "old lady," is rather difficult to translate, and has many connotations in different contexts, all pejorative. A more literal translation would be "Baba off the wagon, lighter for the horses." It is usually understood as an exhortation to eliminate non-essential elements, so as to make a difficult task easier, or for a person whose presence is not absolutely essential in a difficult situation to withdraw. An equivalent English metaphor (though not strictly speaking a proverb) would be to speak of "throwing off the ballast" or "getting rid of deadwood." It is becoming somewhat more common in Polish culture for women to take exception to this proverb as being explicitly sexist.

An analysis of [43] indicates that T1 has completely failed to grasp the point her mother was trying to make: namely, that the sister's absence from home would make their lives easier. At first glance, it would seem that T1 has simply concretized the metaphor. Upon closer examination, however, we see that she did not really understand either the literal or the metaphorical meaning. She has picked up only the words "horses" and "old lady" and freely associated, to create a rather rambling, not completely coherent text. The last sentence in [43], the aphorism about "higher needs," is typical of T1's tendency to fall back on edifying platitudes, not always relevant to the pragmatics of the situation in which she is speaking.

Example 8

Patient K2 (male, age 35, an industrial accident), has been criticized by his mother in front of the patient therapy group for using too many "dirty words" at home. He does not reply verbally but begins to weep. Patient K1, a young woman, begins to stroke his hand.

K1. Have you always had such a brittle psyche? [44]

K2. A person isn't always consistent in his judgements. He changes his mind, succumbs to suggestions made by others. You can look at that in one way and say, that's good, because he knows how to listen. But if he is always doing just what others are telling him to do, that's bad, he's being manipulated. A psyche like that can break down, fall into a pit and there'll be a disaster, I'll be in a pit and I won't smile. But I'm not sad! I'm [glad of?] everything that is and will be. But you don't laugh as much as you used to. I tell myself not to laugh so much. Because when I talk with someone important it's not good to laugh. [45]

The metaphor used by K1 in [44], “brittle psyche.” is not rare in Polish, though it is probably not common enough to be classified an idiom. Generally, the Polish word *psychika* is used rather more often and more widely than the English *psyche* to refer to one’s emotional self. To have a “psychic” breakdown in Polish means essentially the same as to have a “nervous” breakdown in English: both terms are inexact and somewhat archaic, but in very common use. To have a “brittle” psyche thus refers to what would be called more strictly emotional lability (though again, this word is also a metaphor from Latin, where the verb *labor* means to totter or sway, as in the gait of a person who is drunk).

K2’s response shows a certain defensiveness, but does not address K1’s issue of lability at all. He seems to be defending himself at first against an implicit accusation of being highly suggestible, but distances himself from this by using oddly impersonal, third-person constructions. Later in [45], however, he uses a fairly common expression for depression, “fall into a pit,” but almost immediately contradicts this suggestion by insisting that he is not at all sad. In the next sentence he omits a vital word, which means that his intended meaning can only be inferred. Then he suddenly shifts to the second person for one sentence before returning to the first person.

Generally speaking, this text is disjointed and rambling, with some moments of near incoherence. There is no real response to the question put by K1, though the sentence about falling into a pit perhaps touches indirectly upon his allegedly labile emotional self. This is yet another example (cf. [30]) in which a metaphor that is apparently misunderstood on the surface level seems to exert an indirect influence on the train of thought.

Bizarre metaphors

Example 9

An elderly man (W2), while painting the house the previous day, had carelessly spilled paint on some of his wife’s (W1) carefully tended flower beds. When W1 sees the next day what W2 has done, she goes to the tool shed, takes a spade, and without saying a word begins to dig out the raspberry bushes that line the fence, W2’s pride and joy.

W2. *What the hell do you think you’re doing!* [46]

W1. *What Johnny gave God, God gave the devil a burning coal.* [47]

W2: *Oh, get off my back and don’t call me names! I’ve just about had it! 50 years of your bossing me around!* [48]

The very odd expression used by W1 in [47] is actually a contamination of two metaphors, both of which are known in Polish, though they are not common. The originals read as follows:

What Johnny gave God, God gave Johnny. [49]

A candle for God and a burning coal for the devil. [50]

The point of [49] is of course that God deals with people as they deserve; the idiom is most often used when something bad happens to a notoriously bad person. The point of [50] may be harder to grasp, but it generally refers to the behavior of people who “hedge their bets”; the literal meaning refers to lighting a votive candle in church, while also making an offering to Satan. What W1 clearly means to say is that what she is doing to the raspberry bushes is only fair retribution for what W2 did to her flowers. The “burning coal for the devil” seems to express her anger, though neither the literal nor the presumed metaphorical meaning of [50] is at all clear. W2’s response in [48] indicates that he understood [47] as an act of verbal aggression, but did not comprehend the contents at all.

Example 10

During group therapy, F1 (male, age 32, TBI after a traffic accident) has been relating a quarrel with his wife that took place during the Christmas holidays. His wife (F2) and mother (F3) are both present, but his wife is becoming upset at F1’s overly vivid (and not particularly fair) account of the quarrel. She has not said anything but seems to be crying. His mother intervenes:

F3: Son, you’re playing with fire! [51]

F1. Enough of this screwed-up disputationing! I’ve got to put a stop to this whole mess, because she [points to F2] just sets herself up like a candle at a wedding! [52]

F1 ignores the substance of his mother’s warning, but it is hard to ascertain if he has comprehended the metaphor in [51] or not. In the Polish original, his language is distinctly odd. He uses a non-existent gerund, in [52] translated “disputationing,” that is fairly easily understood to mean quarreling, modified by a mildly obscene adjective that is more characteristic of youth slang than the speech of an adult. The Polish word he uses for “mess” is equally odd, a metaphor whose usual referent is defective merchandise; the precise meaning here is not clear. The last part of [52] combines a common Polish metaphor (“to set oneself up,” understood metaphorically in the sense of assuming a strong, even combative stance in an argument), with a nearly incomprehensible simile. It is not at all clear what he means by “like a candle at a wedding.” It may be related to a colorful, but rather obscene simile, “to stand there like a dick at a wedding,” but the reference in this simile (generally known but rather rarely used) is to the posture of someone standing at a distance on tiptoes to get a look at something interesting. F1 has mixed it with the metaphor of “setting herself up” and perhaps borrowed in some way the “fire” motif from the proverb used by F3. In any event, F2’s role in the conversation to this point has been distinctly passive, at least from the standpoint of an observer, and not appropriately labeled as combative. It was F3, not F2, who cautioned him against giving offense, and his reply could as easily be directed to the former as to the latter, except for his gestures.

Example 11

Patient M2 (female, age 34), with post-traumatic damage primarily to the right hemisphere, shows considerable left hemispatial neglect. Like many patients with egocentric neglect, she often speaks to her paretic left hand in the second person singular. During an art therapy session she uttered the following sentence, while trying unsuccessfully to use her left arm to steady the picture she was working on:

*M2. I've always got you on my head, you trumpets of Jericho.
Come on, get a move on!*

[53]

In Polish, the phrase “to have someone (or something) on one’s head” means that the person or thing in question is a source of constant worry and trouble, as opposed to having someone or something *in* one’s head, which means that one constantly thinks about the object or person in question. “I have everything on my head” is a classic complaint heard in a family or work context from a person who feels that she is burdened with responsibility for everything and everyone in the family or workplace, usually with a clear implication that this results from the irresponsibility of others. It is, of course, distinctly odd as used here by M2, the more so that it is being used in reference to a part of the speaker’s own body in such a way that the literal meaning of the metaphor she has used is patently absurd.

It is not at all clear what M2 meant by the phrase “trumpets of Jericho.” The Biblical allusion is clear enough, referring to the story in the book of Joshua (6:1-27), in which the walls of Jericho “come a-tumblin’ down” at the sound of trumpets. It is not, however, a very common Polish metaphor, and when used it refers to a loud, clear warning of impending disaster. It is nearly impossible to explain why a paretic arm would be called “trumpets of Jericho” as a kind of imprecation. When asked later, M2 could give no clear account of why she had said this, or what the reference to the trumpets of Jericho might mean literally.

DISCUSSION

It is not an easy task to measure objectively the difficulties experienced by experimental subjects, whether healthy or brain-damaged, in handling metaphors. There are no tests that can be used; indeed, no such test can be devised. The pragmatics of the test situation has a distinctive and unavoidable impact on the subject’s behavior, which should undermine our confidence that test results can be mapped to spontaneous behavior in real-life situations. The only alternative way to gather material for analysis is to employ ethnographic methods (Olszewski & Tłokiński 2004).

Most of the recent published research on metaphor, outside of strictly linguistic and literary studies, can be grouped into four general classes, as shown by a review of selected studies from recent clinical literature:

- studies of the development of metaphorical thinking in children, especially with developmental disabilities or autism (Martin & McDonald 2004, Knudsen 2004);
- a considerable body of research on the use of metaphors in “psychological warfare” against cancer and other diseases (Penson et al. 2004, Cook & Frances Gordon 2004);
- psychoanalytical studies (Spero 2004, Lansky 2004);
- neuropsychological studies, focused primarily on localization issues (Rapp et al. 2004, Sotillo et al. 2005).

The study by Rapp et al. (2004) is an fMRI study of metaphor recognition, in which healthy subjects were presented with a metaphorical statement and then asked to identify which of a set of either visual or verbal representations best matched the prompt. To date, however, most of the neuropsychological research done on metaphor has focused on proverb interpretation (Ulatowska et al. 2003). The research task ordinarily involves asking the patient a series of proverbs to interpret, ones that should be familiar to most speakers of a given language. The errors made by the subjects are interpreted as reflecting difficulties in abstract and discursive thinking.

Although these studies have produced some interesting results, we have already pointed out, in the Introduction, that the terms “proverb” and “metaphor” are not interchangeable, and neither of them should be mistaken, *pars pro toto*, for the entirety of discourse. Perhaps the primary reason why proverb interpretation has dominated the subject of metaphor in neuropsychology is that proverbs can be presented as test items, and the errors can be classified and quantified. Since in orthodox cognitivism the term “scientific” means “empirical,” “empirical” means “parametrical,” and “parametrical” means “statistical,” then it is hard to imagine how any topic related to metaphors, other than proverb interpretation, could be the object of experimental studies. The difficulty with this approach, however, is that proverbs constitute only a species of the genus “metaphor,” and perhaps not the most important.

Sotillo et al. (2005) has focused on the dynamic neuroimaging of subjects reading or hearing sentences containing metaphorical expressions (not proverbs) and associating them with either pictures or non-metaphorical paraphrases expressing the same idea from an array of distractors. Although it is too early to generalize on these and similar results obtained by other authors searching for the localization of metaphor processing, it seems clear that the activity is widespread and includes both hemispheres at various phases in the process. Rapp et al. (2004) independently reached similar conclusions, that over the course of time (measured in milliseconds) the focus of activation shifts from the left hemisphere to the right and then back to the left. Thus metaphor processing is clearly part of the language system (which is generally organized in specific areas of the left hemisphere), but seems to require significant right-hemisphere involvement. The wide dispersion of the areas activated in rapid succession by metaphor-related tasks may explain why both TBI patients and the demented, who

very typically have dispersed areas of neuron loss, are particularly inclined to problems in the use and understanding of metaphors.

There does not appear to be a localized center for “metaphor processing” that would be disconnected or destroyed by a focal lesion in a particular area. Both the left hemisphere, with its sequential processing of information, and the right hemisphere, which focuses on context and situation, have essential roles to play in the use and comprehension of metaphors.

A microgenetic interpretation

Rohrer (1995) states that metaphorization is the single most characteristic feature of human thought as such. Certainly it is the case that neither animals nor computers can operate with metaphors, other than by using algorithms (in the case of computers) to decode the metaphor and arrive at its meaning (Kaczmarek 2003). The human mind is uniquely capable of seeing the concrete, phenomenal world presented by the senses, and at the same time seeing analogies and metaphors pointing to other phenomena imminent in the perceived objects. To gaze at a sunset and think of death is a uniquely human act. It is impossible at this remove in time to recover the moment when something like this first occurred in the brain of some remote human ancestor, but it is hard to escape the conclusion that, whenever and wherever this moment occurred, when one thing brought to mind another of a different kind, this was the dawn of the human mind.

It would seem perfectly logical that in the production of a metaphor it is the metaphorical meaning that embodies the speaker’s intention, and the specific metaphor is chosen to convey this meaning, while in the interpretation of a metaphor the process is reversed: the literal meaning is comprehended first, and the comprehension of the metaphor arises as a result of a second-pass process. Upon further examination, however, little proof can be found for this apparently logical account. Only when the metaphor is particularly novel and abstruse, as occasionally it is in poetry, does the mind linger over the metaphor and attempt to re-trace the path of its creation. When we hear, for example,

He was as mad as a wet hen, [54]

we do not first think of a wet hen, and then apply its characteristics to an angry human being. Rather, metaphors such as [54] are essentially lexical items which appear in the consciousness of both speaker and listener as a complex whole, containing both planes of meaning from the inception. It is only when a metaphor is truly novel and original that the listener (or, more often, reader) must linger over it, teasing out from the literal referent the features that actually pertain to the topic at hand. Like any mental act a metaphor has a microgenesis that runs essentially the same whole-to-part course laid down by evolution (Brown 2003). It is not assembled by linking a preexistent metaphorical meaning to a independently preexistent literal meaning, or vice versa, but rather emerges from the perception of analogy. This is consistent with a basic principle of microgenetic

thought that cognition emerges from the perception of gestalts and evolves towards the analysis of its detailed features, and not from the assembling of bits into ever larger wholes. Metaphors are not built in the mind, they evolve. Those that have taken on lexical status have reached a kind of plateau, since the process of their evolution has lasted for many years, even centuries; the received meaning is a kind of hard surface or shell, covering the layers of process that produced it. Original poetic or rhetorical metaphors, on the other hand, have not hardened with time, so that the process is as much evident as the product.

The tendency of many of the patients described here to concretize metaphors can thus be understood not as a failure of some presumed second-pass process of analysis, but as a defect occurring in the microgenesis of the metaphor. This means that the utterance is processed in the posterior brain as an explicit statement of fact, rather than as a metaphor. In these cases, then, there are no significant errors in the purely verbal decoding of the vehicle, but a basic misunderstanding of the speaker's intent. If a normal, healthy listener understands the metaphor, it is not because of "second-pass processing," in which the brain would presumably be prompted by a lack of fit between the utterance and the context to explore the possibility that a metaphor is at play. Rather, the comprehension of the metaphor is a single mental act, parallel to the comprehension of any other word or phrase. It is not a "second pass," but a continuation. If the metaphorical quality of the utterance is not grasped immediately, it can only be recovered with difficulty, and with conscious mental exertion. This often occurs in the processing of metaphors in a foreign language, when the speaker has acquired a level of fluency where the vocabulary and grammar of the new language have been largely mastered, but the common idioms, proverbs, and metaphors² sound very strange.

As was previously noted, the production of proper metaphors is closely related to the development of the logical and spatial coherence of the self system conditioned by the proper functioning of the entire brain. This is ensured not only by properly functioning structures, but also by connections within each hemisphere, between both hemispheres and their connections with subcortical structures (Pąchalska, Kaczmarek and Kropotov 2014). Differences in the functioning of the right and left hemispheres of the brain within the self system are illustrated in Fig. 2.

It can be seen that the dominant hemisphere of the brain (usually the left in right-handed persons) is closely related to language functions. Therefore, it provides logical coherence possible thanks to linguistic images, which includes language models, grammar and vocabulary, as well as internal narration and dialogue. An important role is also played by the ability of linguistic expression, which is enabled by efficiently functioning articulatory organs and limbs (writing and signaling language statements). Based on this, language texts are created, among which a special role is played by narrative and external dialogue that enables contact with other people. Patterns of neural network connections that evoke

² It should be recalled that these three categories of verbal structures overlap to a great extent, but are not co-extensive.

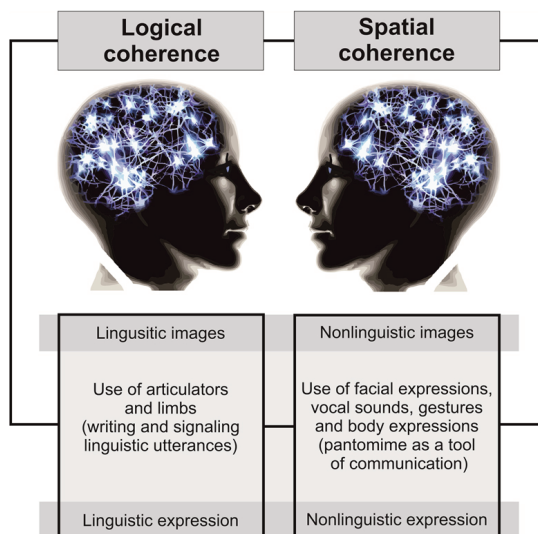


Fig. 2. Differences in the functioning of the right and left hemispheres of the brain within the Self system
 Source: Pachalska (2019)

thoughts (and thus behaviors) that promote the well-being of the body are permanently encoded, while useless ones disappear (Carter 1999; Pachalska, Kaczmarek, Kropotov 2014).

The subdominant hemisphere of the brain is closely related to nonlinguistic functions (generally the right in right-handed persons). Thus, it provides spatial coherence based on nonlinguistic images: image models and “body grammar,” i.e., images evoked by facial expressions, gestures and a sequence of movements (pantomime). This enables, through the use of facial expressions, phonic organs (vocalization), limbs (gestures) and the whole body (pantomime, “body language”) nonlinguistic expression. This creates nonlinguistic messages: acoustic (voice, sound) and visual (drawing, gesture).

People with brain damage exhibit disturbances in logical or spatial coherence depending on the location of the damage (structures and neural connections) in the right or left hemisphere of the brain. Linguistic representations are more or less disintegrated, which makes creating language constructions more difficult, as a result of which the process of creating ideas about yourself and the world is disturbed, which is why the image of oneself and, as a result, the whole system of the self is disintegrated. Damage to the subcortical structures and connections is also not without significance, however, the picture of disorders is different, something described in more detail in another work (Pachalska, Kaczmarek, Kropotov 2014).

The use of odd or inappropriate metaphors by some patients is likewise better explained from the standpoint of errors in microgenesis. The examples quoted here are in many ways analogous to paraphasias: there is an error in metaphor

construction at the beginning of microgenesis, but the faulty utterance is processed normally in subsequent phases (Brown & Pachalska 2003) and takes on a linguistically correct form, as far as the surface structure of the utterance is concerned. Indeed, it would perhaps be possible to pair the errors we have noticed in our material to the various species of paraphasia, assuming that a given error occurs at a given moment in the unfolding of the complex mental act involved in using a metaphor to express a thought or feeling. This will require, however, further research.

Since the work of Lakoff, Johnson, and others, the concept of metaphor has come to be an important, indeed central issue in semantics, but the broader concept of metaphor used in these studies has still not attracted much interest within the neurosciences. Previous neuropsychological research on metaphor use by patients with brain damage has tended to focus primarily on proverb interpretation. In the present study, as in several recent imaging studies of interest, the authors have attempted to broaden the scope of inquiry. Qualitative methods based on material gathered in real-life situations are essential to this project.

CONCLUSIONS

It was found that the TBI patients we studied showed a marked tendency in spontaneous conversation to concretize or misunderstand the metaphors used by others, and to use inappropriate or bizarre metaphors in their own speech. On many occasions, however, the gist of the metaphor emerged at some later point in the discourse, despite the surface problems.

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