

DISTURBANCES IN THE USE OF METAPHORS IN PATIENTS WITH TRAUMATIC BRAIN INJURY

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SUMMARY

Introduction. *Metaphors in the narrow sense are words or phrases that have a literal meaning (called the "vehicle") conveying an intended reference to another semantic category (the "tenor"). In the broader sense, some linguists argue that all meaning in language arises from metaphors. Although metaphors have been a subject of intensive discussion in linguistics over the last two decades, there has been rather little interest in the brain mechanisms of metaphor, other than research in proverb interpretation and some recent neuro-imaging studies on localization. The purpose of the present study was to examine the use and misuse of metaphors by patients in rehabilitation after severe traumatic brain injury (TBI).*

Material and methods. *We gathered spontaneous utterances in various contexts and situations from taped conversations involving 12 severe TBI patients undergoing rehabilitation in the Academy of Life program (elsewhere described).*

Results. Four major types of errors were seen: non-comprehension, concretization (interpretation on the strictly literal level), misapplication (use of a metaphor that is not appropriate to the context in which it is used), and bizarre, idiosyncratic metaphors. Two examples are given of each error type.

Conclusions. Metaphors are both created and interpreted as a whole, and not as two separate parts, each resulting from a separate process. Errors do not arise from a cleavage between tenor and vehicle, but rather from a failure of the metaphor to evolve normally in microgenesis. Further research is required to study how the brain performs the operations involved in analogical and metaphorical thinking.

INTRODUCTION

What is a metaphor?

Metaphor in the narrow sense is a figure of speech, in which a word or phrase is used in a non-literal or figurative sense to make an "implied comparison of dissimilar things" (Hodges, Whitten & Webb 1986:227). In traditional terminology the metaphor is a whole consisting of two parts:

- the *vehicle*, which is the literal referent of the word or phrase used to convey the metaphor;
- the *tenor*, which is the object, event, or person to which the metaphor is meant to refer.

In this sense metaphors are usually listed in handbooks of style alongside similes, where the only essential difference would seem to consist in the fact that the simile by definition contains the word "like" or "as." In some contemporary linguistic theories, then, metaphors are interpreted as "truncated" or "abbreviated" similes, in which the "like" or "as" that makes the simile explicit has been suppressed (or "gapped", to use the technical term from generative grammar). Thus metaphors are derived from similes according to transformation rules that can be described. A metaphor such as "The politician thundered against his enemies" can be interpreted as a transformed version of a pre-existent simile: "The politician's voice when he denounced his enemies was like thunder."

As a figure of speech, metaphor in the classical sense described above is a rhetorical feature of ornate, erudite speech, used especially by poets and orators to escape from the prosaic, directly referential character of ordinary language. Handbooks of English style traditionally warn the unwary writer against the sin of "mixed metaphors," such as "Playing with fire can get you into deep water" (Hodges, Whitten & Webb 1986:250). 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 scientific interests have tended to focus on the spontaneous and artless utterances of ordinary people, 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 was one of the major contributing factors to the charge that psychoanalysis is "non-scientific," in contrast to "mainstream" psychology. For perhaps obvious reasons, metaphorical thinking was not an attractive topic for discussion in behaviorist psychology, and for that matter cognitivism has not shown any 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. Metaphors are analyzed only in order to get past them, i.e. the vehicle is discarded as quickly as possible to reveal the tenor.

The status of metaphor over the last two decades or so has been quite different in linguistics. In 1987, both George Lakoff and Mark Johnson, in independent publications (yet another example of serendipity in science, the proverbial "power of an idea whose time has come"), retrieved metaphors from the margin of linguistic studies and placed them at the very heart of semantics (Lakoff 1987, Johnson 1987). The primary thesis of both authors was that all meaning in language is essentially derived from a process of metaphorization. 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 any given language there exists a very small core of primitive morphemes that correspond in an arbitrary and direct fashion to specific designates. 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. Even the word "metaphor" is itself a metaphor in this sense, since it is derived from two ancient Greek morphemes, *meta-* 'across' and *phor* 'carry', where the notion of "carrying across" is a metaphor for what happens when we use a metaphor: that is, meaning is "carried across" from one plane of reference to another.

Metaphor in the narrow sense, as a figure of speech used by a writer, is a conscious device, while the metaphors to which Lakoff, Johnson and others have drawn attention are largely used by native speakers of the language without conscious awareness of their metaphorical nature. This kind of "unconscious" metaphor is an artifact of language embedded in the word itself, readily used and understood by most speakers of a given language, and thus

constituting part of the lemma. Thus dictionaries tend to divide their definitions of words into "literal" and "transference" or "figurative" meanings, where the latter terms can hardly if at all be distinguished from "metaphorical," at least in the broad, Lakoff-Johnson sense. Some would still prefer to make a distinction between a metaphor, as a word or phrase used in a non-literal sense for a specific effect, and the figurative or transference meaning of a word, but the distinction, though perhaps fairly easy to make in the abstract, is hard to maintain in concrete cases.

Metaphors are extremely common, indeed essential, in the creation of new vocabulary, including especially technical language. Genetics and computer science provide two excellent examples of fields in which the creation of new terminology has taken place at a dizzying pace over the last several decades. The difficulties encountered by the non-initiate in reading texts from these and similar fields of study are often caused by the hieratic language, which consists not only in the appearance of completely unfamiliar words, but also in the pervasive use of metaphors, i.e. familiar words used in quite unfamiliar senses.

Metaphor and analogy

In classical antiquity the concepts of analogy and metaphor were an essential element of philosophical discourse. Even Julius Caesar, in an interlude of free time between planning battles and political intrigues, wrote an essay entitled "On Analogy," which unfortunately has not survived. The argument, derived from Greek philosophy, was basically an ontological one: if there is an analogy between two things that enables them to be compared in words, is this simply a matter of language, or are the two things bound to each other in some way metaphysically? Caesar, as an Epicurean and thus an atomist, was inclined to the former position: analogies may seem convincing, but they are illusions. By extension, then, metaphors are held to result from the imprecision and poverty of the vocabulary of any human language, the borrowing of words from one concept to express another, for which there are no words. The bond between tenor and vehicle in a metaphor is thus a matter of convenience, and should not be mistaken for any kind of inherent existential bond between the two things. For metaphysicians, on the other hand, that same bond results from the shared participation of the two phenomena in the same metaphysical category. For these philosophers, it is the dissimilarity of tenor and vehicle in a metaphor that is specious.

The practice of the ancient philosophers in the use of metaphors and analogies is perhaps more revealing than their theory. The dialogues of Plato are replete with arguments built on analogies, of which perhaps the most famous is the "cave" simile from Book VII of the *Republic*. Socrates, asked point-blank the basic question of ethical theory, "What is the Good?", replies in essence: "I cannot tell you what the Good is, but I can tell you what it is like," and proceeds to develop three analogies: the divided line, the sun, and finally the cave. Aristotle, though he devoted considerable attention to the

issue of analogy, seldom used metaphors or analogies in his teaching, which is what makes reading Aristotle so different a task from reading Plato. Several centuries later, in a very different context, the Synoptic gospels present Jesus teaching primarily in parables, which can be understood as analogies elaborated into complete narratives; the gospel of John, on the other hand, has few parables but numerous metaphors (e.g. "I am the vine, you are the branches," Jn 15:5).

In the contemporary theory of information processing, analogy and metaphor are understood as the cognitive and linguistic aspects respectively of the same basic mental phenomenon, defined as "mapping between domains" (Bowdle and Gentner 2005). At the same time, however, the pervasive metaphorization of language pointed out by Lakoff, Johnson, and others points to analogy as 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, common features of differing objects, but they do not use or understand metaphors (Kaczmarek 2003). Computers can be programmed to handle metaphors, but only when they are given an algorithm to decode them: that is, the metaphor must be converted to a non-metaphorical statement in order to be interpreted. It is not clear, however, that the human brain does the same thing (see below, Discussion; cf. Nikolaenko & Vershinina 2004).

Metaphor as a category of speech act

In linguistic terms, the use and interpretation of metaphors is primarily an aspect of pragmatics. It is the context in which an utterance is made that ordinarily decides whether the speaker intends for the literal meaning of the utterance to be referred to some other plane of meaning. By definition, a metaphor is an expression that has both a literal and a figurative meaning, in the absence of explicit indications which of the two (or more) possible readings are actually meant. Only very occasionally are such expressions as "so to speak" used to signal the fact that a word or phrase is being used in a non-literal way. 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.

The metaphor as a speech act that embodies and expresses an analogy is very much a "fuzzy" category: that is, we can identify a certain number of speech acts that are clearly metaphors, a certain number that are clearly not metaphors, and a very large boundary area of speech acts that may or may not be metaphors. In particular, metaphors share a rather large boundary area with idioms and proverbs, both of which can be understood as metaphors that have become stereotyped.

Metaphor and idiom

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 couldn't care less" is an idiom that will be taken by any native speaker as an expression of complete indifference, even though if re-phrased "I would not be able to care less" it could be interpreted in several ways, one of which would be nearly the exact opposite of the ordinary intended meaning of "I couldn't care less" (as though one were to say, "I care so much about that this that even if I wanted to, I would *not be able to care less*"). The meaning of the idiom is sanctioned by convention, just as the meaning of words is sanctioned.

Many idioms are metaphors, but many others, such as the example just given, are not. The meaning of the idiom is itself a lexical item, part of the linguistic competence of the speaker, and does not require hermeneutic analysis, which in most cases would lead to an erroneous interpretation. If the idiom embeds a metaphor, to say that the expression constitutes an idiom is tantamount to stating that it has essentially lost its metaphorical force. The familiar English expletive beginning with "f", for example, comes from an Anglo-Saxon verb meaning "to till", i.e. the soil. Its use in reference to the sexual act is clearly a metaphor, but over the course of centuries the literal meaning has been essentially effaced, leaving the former metaphorical meaning as the current literal meaning. Indeed, Bowdle and Gentner (2005) argue that metaphors exhibit something they call a "career," which leads from their formation by a particular person at a particular moment in time, to their transformation into a fixed lexical item, where the previous literal reference of the metaphorical word is rarely used, or not at all. The infamous "f-word," then, as a verb meaning "to engage in sexual intercourse," has gone from metaphor to idiom to figurative meaning to literal meaning in a series of transitions.

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, also, 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" to say something like this: "It is better to stay with what one already has, than to risk ending up with nothing to pursue something that perhaps cannot be attained." One could as easily say, "A fish in the creel is better than two fish in the stream," and the metaphor would be just as apt, if not more so, and perhaps better understood on the literal level than the "bird in the hand" proverb; but tradition sanctions the "bird in the hand," so that is the proverb, and the "fish" version is at best a metaphor.

The Polish equivalent of this proverb reads, "A sparrow in the hand is better than 100 pigeons on the roof." This is not a hunting metaphor, of course, but the vehicle seems close enough in its literal meaning, and the Polish

proverb is used in the same contexts to mean essentially the same thing. 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 most cases, for example, the existence of similar proverbs in Polish and English results from a common Latin ancestor, sometimes with adaptations: one says in English, for example, "Rome wasn't built in a day," but in Polish, "Cracow wasn't built in a day." In this case, however, it would be hard to make the case that this proverb is a metaphor, since there is not a single word that is being used simultaneously in both a literal and figurative sense. The proverb "Rome wasn't built in a day" is used to say, "A great work requires a lot of time"; however, the literal statement is not an analogy from a different plane of reference, but rather an example of the phenomenon described. "Just as Rome wasn't built in a day, so what we are doing is going to take a lot of time".

Purpose of study

The purpose of the present study is to focus attention on the particular problems exhibited by patients with traumatic brain injury (TBI) in the use and understanding of metaphors.

MATERIAL AND METHODS

Material

We studied a group of 12 patients, who underwent rehabilitation after a severe head injury in the period 2002-2004 in the Department of Rehabilitation at the Rydygier Academy of Medicine in Bydgoszcz, Poland (currently the College of Medicine of the Nicholas Copernicus University), or in the Department of Medical Rehabilitation at the Cracow Rehabilitation Center in Cracow, Poland.

The group included 5 women and 7 men. The average age was 31.9 ± 8.62 years; as a group, the women were somewhat older (32.4 ± 9.21 vs. 31.0 ± 9.89). As is typical for the TBI patient population, then, these were predominately young people, with a predominance of males.

The research was conducted 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 in one of the participating centers. 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 develop in response to the needs and moods of the patients.

The inclusion criteria were as follows:

- TBI within 5 years of the date of testing;
- post-traumatic coma and PTA lasting cumulatively for at least one month;
- structural brain damage confirmed by neuroimaging (CT or MRI).

The exclusion criteria included the following:

- aphasia, as measured by the FAST-PL (Frenchay Aphasia Screening Test, Polish Version);
- dementia, indicated by a Mini Mental State Examination score of 24 or lower;
- age less than 18 or greater than 60 at the time of the accident.

The purpose of applying these criteria was to eliminate specific, confounding deficits of language processing or overall cognitive status as a possible direct cause of the patients' difficulties in handling metaphors. The application of the age criteria meant that the patients as a group were well within the so-called "productive age."

Further neuropsychological screening was done as part of routine testing of severe TBI patients participating in the Academy of Life program. A summary of the results, giving an overall profile of the group, is given in Table 1.

Table 1. Summary of results from standard neuropsychological tests

Instrument	Max. possible/ Norm	Min.	Max.	Ave.	SD
WAIS – R					
Full Scale IQ	100	89	98	93.3	2.71
Verbal IQ	100	92	104	98.6	4.01
Performance IQ	100	85	91	87.8	1.60
WMS – R					
Immediate logical memory	24	18	23	20.3	1.60
Delayed logical memory	24	15	21	17.5	2.02
Immediate visual recall	41	28	39	35.5	3.15
Delayed visual recall	41	25	35	30.9	2.57
Language functions					
BNT (Polish Version)	60	54	59	57.3	1.50
FAST	30	27	30	28.9	1.00
Global cognitive status					
MMSE	30	25	29	28.3	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	18	27	23.3	2.84

As can be seen from the results summarized 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, especially B, generally thought to be an indication of executive dysfunction, these were not extreme. On the Beck Depression Inventory, 7 of the patients (3 women, 4 men) showed signs of depression, but none were severely depressed.

Research methods

It is not an easy task to measure objectively the difficulties experienced by subjects in handling metaphors. The context of testing itself is a distorting factor, and indeed there is no compelling reason to suppose that a subject's ability or inability to interpret a metaphor when explicitly asked to do so in an artificial setting is transferable to real-life communicative situations. This is a general problem with pragmatic competence in language, since the test situation is itself a context and invokes pragmatic rules that differ from those of other contexts. Ethnographic methods generally give the best results (Olszewski & Tłokiński 2004).

Accordingly, we decided to make use of material gathered spontaneously and incidentally in the course of a larger research project on discourse and pragmatics in patients undergoing neuropsychological rehabilitation. The material involves video and audio recordings of open-ended conversations with patients, subsequently reviewed and analyzed by the authors for problems in metaphor use and comprehension. In particular, we focused on 4 types of errors:

- *non-comprehension*, i.e. the listener's inability to comprehend the meaning of a metaphor used by the speaker, as indicated by lack of an adequate response, an expression of puzzlement, or a question as to the meaning of the word or phrase used metaphorically by the speaker;
- *concretization*, which occurs when the listener reacts to the vehicle of the metaphor rather than its tenor;
- *misapplication*, when the speaker uses a metaphor in an inappropriate context;
- *use of incomprehensible or bizarre metaphors* by the speaker, so that the intended meaning is difficult or impossible for the listener to ascertain.

In what follows the transcribed material has been translated 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.

It should be stressed that the researchers interviewing these patients and recording their utterances did in fact make occasional efforts to introduce proverbs 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 utterances identified as metaphors or proverbs. For the most part, then, the material reported here was produced spontaneously. As will be noticed, in many cases the material involves conversations in which the researcher was not an active participant; the interlocutor is more often another patient or a family member. It should be noted that examples of the error referred to above as "misapplication of metaphors" were not rare in the speech of healthy individuals conversing with the patients.

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 are identified only by a random letter-number combination.

RESULTS

In the recorded material, by far the most common problems involved concretization, followed by misapplied metaphors; non-comprehension and bizarre metaphors came in a distant third. For obvious reasons, however, it is not easy to analyze this material statistically; in what follows, then, we provide several examples of each kind of error in handling metaphors, selected from among many examples.

Concretization

Example 1

This conversation took place between two of the men enrolled in our study. Patient B2 (male, age 33, TBI resulting from an assault, diagnosed with frontal syndrome) has been complaining rather vociferously 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 regards as necessary, the rare and short visits of his family, etc. etc. B1's patience is nearly exhausted.

B1: Well, you certainly are poisoning today.

B2: Me? No, it's my wife that doing the poisoning. She puts chemicals in my food and poisons me. Rat poison. Arsenic. Or cyanide. Then I have a belly ache.

In his opening, B1 uses a very common Polish idiom, "to poison" in the sense "to complain incessantly," perhaps most nearly equivalent to the collo-

quial American English use of "bitch" as a verb. B2 fails to pick up the metaphor, however, and responds to the remark 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 patients enrolled in the study. D2 (age 22, TBI after automobile accident with multiple injuries) has complained that the orthopedic apparatus he had received the previous day was not of the best quality. D1 grows weary of the complaining and tries to calm D2 down by using a familiar proverb (the same in Polish and English), pointing out that the allegedly defective equipment was given to D2 free of charge.

D1: Well, I always say, don't look a gift horse in the mouth.

D2: I don't know a thing about horses, but I know a horse doesn't like it much when you look at his 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 gives him a kick.

In this example, 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 he has at some level grasped the point D1 was trying to make, and at least indirectly tries to defend himself.

Misapplied metaphors

Example 3

Patient A1 (male, age 24 at present, 19 at the time of his accident) has been watching a film entitled "Extraordinary People," shown to patients attending the Academy of Life. The film (made by the first and second authors of the present study) is intended to evoke emotion, and indeed A1 has started weeping. His mother reacts.

Mother: Well, I'm glad to see you don't have a heart of stone after all.

A1: Yes! A human being *has a heart*. A heavy heart. *I have heart of stone*. Yes!

Patient A1 suffered several 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 (he studied English in high school), with frequent jumps from one language to the other and some very peculiar mannerisms, resulting in part from contamination of the two languages, and in part from a severe attention deficit. However, his performance on intelligence tests is in 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 60 prompts, but 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.

In the text here, the words spoken in English are shown in *Italics*.

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 but turns the vehicle 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 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 4

Patient R1 (male, age 25) is talking with his attending physician, who has dropped in to the Academy of Life to see how R1 is doing at home.

Physician: Are you exercising with the physiotherapist at home?

R1: No, I quit! Because lately, he was really laying it on thick... Holy cow!... wore me out so that he ripped my guts out, all my muscles were aching... sweat was pouring... holy cow!... like out of the rain and under the gutterspout.

Here patient R1 has used two common Polish metaphors, but neither of them is used correctly, which in fact baffled his physician interlocutor completely. "To rip out someone's guts" means to attack someone verbally; it 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 gutterspout," on the other hand, is very nearly 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 very hard 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. Its use is considered indicative of a relatively low social status.

Lack of comprehension

Example 5

The sister of female patient T1 (age 24, TBI after automobile accident) has changed colleges and moved to another city, complaining that her parents are so busy with taking care of T1 that they have no time for her. Now T1 is talking with her mother, who uses a conventional Polish proverb.

Mother: If we throw the old lady off the wagon, the horses will have an easier pull.

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.

The metaphor used here by T1's mother 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.

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 vehicle or the tenor. She has picked up the words "horses" and "old lady" and freely associated, to create a rather rambling, not completely coherent text. Not surprisingly, this patient has a pathological score on the Frontal

Behavioural Inventory. The concluding remark about "higher needs" is typical of her tendency to fall back on edifying platitudes, not always relevant to the pragmatics of the situation in which she is speaking.

Example 6

Patient K2 (male, age 45, industrial accident), has been criticized by his mother in front of the 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?

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.

The metaphor used by K1, "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 then 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, 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 touches indirectly upon his

allegedly labile emotional self. This is yet another example (cf. Example 2) 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 7

During group therapy in the Academy of Life, F1 (male, age 42, TBI after traffic accident) has been relating a quarrel with his wife that took place during the Christmas holidays. His wife and mother 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:

Mother: Son, don't play with fire!

F1: Enough of this screwed-up disputationing! I have to put an end to this mess, because she [points to his wife] just sets herself up like a candle at a wedding!

F1 ignores the substance of his mother's warning, but it is hard to ascertain if he has comprehended the proverb she used or not. In the Polish original, his language is distinctly odd. He uses a non-existent gerund 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 word he uses for "mess", *feler*, is equally odd, a metaphor whose vehicle is defective merchandise; the precise referent is not clear. The last part of this sentence contains a common Polish metaphor ("to set oneself up," understood metaphorically in the sense of assuming a strong, even combative stance in an argument), followed by 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 his mother. In any event, the wife'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 F1's mother, not his wife, that 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 8

Patient M2 (female, age 52), 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 was heard to exclaim, when 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!

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 s/he 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 vehicle of the metaphor 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 message of impending disaster. Why a paretic arm would be called "trumpets of Jericho" as a kind of imprecation is nearly impossible to explain. When asked later, M2 could give no clear account of why she had said this, or what the reference to the trumpets of Jericho means literally.

DISCUSSION

Most of the published research done to date on metaphor, outside of linguistic and literary studies, can be grouped into four general classes, as shown by a review of selected studies from the year 2004:

- studies of the development of metaphorical thinking in children, especially with developmental disabilities or autism (Martin & McDonald 2004, Knudsen 2004, Nikolaenko & Vershinina 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 to interpret a series of proverbs 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, it should be borne in mind, as stated in the Introduction of this article, that the terms "proverb" and "metaphor" are not interchangeable, and neither of them should be mistaken, *pars pro toto*, for the entirety of discourse. Indeed, it may be worth considering why this one aspect of metaphorical language has attracted so much attention. 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. Insofar as we understand the term "scientific" to coincide with "empirical", "empirical" with "parametrical", and "parametrical" with "statistical," then one may venture the statement that proverb interpretation has so far provided the only means of doing "scientific" research on metaphors. The difficulty with this approach, however, is that proverbs constitute only a species of the genus "metaphor," and perhaps not the most important or most pervasive. Moreover, there is little or nothing to be learned from performance in a test setting in respect to the subjects' ability to use metaphors spontaneously.

Recent research by Sotillo et al. (2005) has focused on 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 the focus of activation shifts from left hemisphere to right and then back to left. Thus metaphor processing is clearly part of the language system but seems to require significant right-hemisphere involvement (Nikolaenko & Vershinina 2004). The dispersion of the areas activated in rapid succession by metaphor-related tasks may explain why TBI patients, who very typically have dispersed areas of damage, are particularly inclined to problems in the use and understanding 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 ani-

mals nor computers can operate with metaphors, other than by using algorithms (in the case of computers) to decode the metaphor and arrive at its tenor (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 of other phenomena imminent in them. 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 humanity.

It would seem perfectly logical that in the production of a metaphor the tenor of a metaphor arises first in the speaker's consciousness, and then an appropriate vehicle is sought to convey it, while in the interpretation of a metaphor the process is reversed: the vehicle, or its literal meaning is comprehended first, and the comprehension of the tenor 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 in poetry, does the mind linger over the metaphor and attempt to re-trace the path of its creation. Rather, the metaphor appears in the consciousness of both speaker and listener as a complex whole, containing both vehicle and tenor from the inception. Like any mental act, then, 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) tenor to a (preexistent) vehicle 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, they evolve.

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 formation of the metaphor as such. In the microgenesis of the metaphor in the posterior brain the speech act emerges 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. If its metaphorical quality is not grasped immediately, it can only be recovered with difficulty, and with conscious mental exertion.

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.

CONCLUSIONS

Since the work of Lakoff, Johnson, and others, the concept of metaphor has come to be an important, indeed central issue in linguistics, but this broader concept of metaphor has still not attracted much interest in 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. 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.

Further research is required to develop a taxonomy of errors and produce a more precise model of how the brain produces and understands metaphors in both ordinary and artistic speech.

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