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Studi

Broca and the General Language Faculty

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Abstract In this paper, I examine the important impact of Paul Broca on our understanding of language. Broca not only discovered the brain area responsible for language production, but he also highlighted the importance of a general language faculty – as Ferdinand de Saussure would later do in his *Course in General Linguistics* – considered as a kind of semiotic faculty that enables us to establish a constant relationship between an idea and a sign, between an entity that is situated on the level of content and an entity that is situated on the level of expression. Saussure later emphasized that this faculty of associating something on the level of content with something on the level of expression is a natural tendency in every human being. In this paper we will argue – with reference to the socio-constructivist theory of meaning – that the "generality" to which Broca refers should be understood to be closely correlated with the "naturalness" intended by Saussure. In particular, general and natural should be considered together, taking into account the ways in which human beings who live within a linguistic community put into practice, from childhood, their ability to build a language and, conversely, what happens when, in cases of aphasia, patients - so to speak - "lose the words". Both children who are acquiring their mother tongue and aphasic patients who fail to "find the words" behave in a holistic way, within forms of life, that is, shared situations in which their own life experiences, habits, knowledge, words and so on come to life.
KEYWORDS: Language Acquisition; Aphasia; General Language Faculty; Generality/Naturalness; Repair Strategies.

Riassunto *Broca e la facoltà generale del linguaggio* – Lo scopo di questo lavoro è di soffermarci sulla figura di Paul Broca, considerando non solo la sua importanza per aver scoperto l'area del cervello responsabile della produzione linguistica, ma, soprattutto, per aver sottolineato – cosa che farà poi esplicitamente Ferdinand de Saussure nel suo *Corso di linguistica generale* – l'importanza di una facoltà del linguaggio più generale che si caratterizza come una facoltà di tipo semiotico che consente di stabilire una relazione costante tra un'idea e un segno, tra un'entità che si colloca sul piano del contenuto e un'entità che si colloca sul piano dell'espressione. Saussure sottolinea che questa facoltà di associare qualcosa sul piano del contenuto a qualcosa sul piano dell'espressione è una tendenza del tutto naturale di ciascun essere umano. In questo saggio sosterremo – facendo riferimento a una teoria socio-costruttivista del significato – che la generalità di cui parla Broca va intesa in stretta correlazione con la naturalità di cui parla Saussure. In particolare, generale e naturale vanno considerati insieme, tenendo conto del modo in cui gli esseri umani che vivono all'interno di una comunità linguistica mettono in pratica, fin dalla loro più tenera infanzia, la loro capacità di costruire una lingua e, specularmente, di che cosa accade quando, nei casi di afasia, i pazienti – per così dire – "perdono le parole". Sia i bambini che acquisiscono la lingua materna che i pazienti afasici che non riescono a "trovare le parole" procedono in maniera olistica, all'interno di forme di vita, di situazioni condivise in cui prendono vita le loro esperienze, le loro abitudini, i loro saperi, le loro parole ecc.
PAROLE CHIAVE: Acquisizione del linguaggio; Afasia; Facoltà generale del linguaggio; Generalità/Naturalezza; Strategie compensatorie.

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Introduction[1]

THIS PAPER AIMS AT HIGHLIGHTING the importance of Paul Broca for general linguistics. It's no accident that Paul Broca is mentioned by Ferdinand de Saussure in his *Course in General Linguistics*, in particular in the chapter dedicated to the object of linguistics, meaning by the term *object* (in French *objet*) the goal of linguistic inquiry.

Paul Broca is known for having shown clearly in 1861 – on the basis of the *post mortem* examination of the brain of a patient named Leborgne who failed to speak - the correlation between the speech impairment (called by Broca *aphemia*) and a lesion in the patient's left frontal lobe. If, before Broca, the existence of such a correlation was only supposed from Broca it became an established neurophysiological fact.

Broca also spoke of a more general language faculty, on which we will focus considering how this faculty comes to life and how it takes form both in language acquisition and in the loss of language.

This general language faculty is to be understood in a broader semiotic sense, i.e. as a general faculty that combines ideas and signs and makes it possible to express whatever content. This conception of generality has – according to our point of view – to be integrated with the Saussurian's conception of naturalness.

Our hypothesis is that the acquisition of a historical-natural language by the child and the loss of words in aphasic patients are the keys to understand the meaning of generality and naturalness. We will move within a socio-constructivist theory of meaning, where the process of language acquisition is fully realized only through and within a given communicative, affective and relational context.

From this perspective, the early social interactions between the child and those who take care of her/him play a crucial role and are of central importance, since they constitute the necessary context within which communicative signals and meanings expressed by them are progressively shared between the child and the adult. Children organize their learning in a holistic way and patients who suffer from anomic aphasia behave in a similar way.

Broca and the discovery of the site of aphemia

In the mid-nineteenth century the world of neurology was shocked by the accident that happened to Phineas Gage, a twenty-five year old foreman of a construction company: while he was working on the construction of the new railway line Rutland-Burlington, a metal rod pierced his left cheek, perforated the base of the skull and went through the front part of the brain. Following this accident the character of Gage changed radically and he became «fitful, irreverent, indulging at times in the grossest profanity which was not previously his custom, manifesting but little deference for his fellows, impatient of restraint or advice when it conflicts with his desires».[2]

For the first time the connection between a specific brain injury and the ability to behave according to social rules became clear. But the idea of a link between brain injury and the faculties, functions, behaviour and so on of human beings was much older. In Ancient Greece, for example, Hippocrates was well aware of the close relationship between brain and language. In fact he described some cases of temporary loss of the capacity for verbal expression after convulsions. Over the following centuries there were clinical descriptions of aphasic disorders,[3] but only in the nineteenth century was a scientific account of aphasic phenomena formulated.

The early decades of the nineteenth century saw the emergence and spread of a theory of brain functions known as phrenology, elaborated especially by Franz Joseph Gall. In *Anatomie et physiologie du système nerveux en générale et du cerveau en particulier, avec des observations sur la possibilité de reconnaître plusieurs dispositions intellectuelles et morales de l'homme et des animaux par la configuration de leurs têtes* (4 voll., 1810-1819), written in

collaboration with Johann Caspar Spurzheim, he supported the idea of a correlation between certain specific and innate human faculties and certain areas of the brain.[4] The adherents of phrenology began to realize that the human mind was not one indistinct whole and that specific brain regions must guide specific functions.[5]

Gall argued that the task of brain physiology was to situate the psychological and moral faculties in the cerebral cortex. He located 27 faculties (including the instinct for reproduction, love for offspring, perspicacity, etc.) and made a start on brain mapping which provided a powerful confirmation for the usefulness of cerebral localization.

We can find similar suppositions in the work of Jean-Baptiste Bouillaud who - on the basis of statistical data regarding 64 patients with neurological injuries - came to support the existence in the brain of «a particular *force* devoted to govern, to *coordinate* the wonderful movements by which man, in an articulate voice, communicates his thoughts, feelings and paints so to speak the movements of his soul [italics in the original]»;[6] this force was believed to be located in the anterior lobes of the brain and was defined as the «legislative organ of speech».[7]

Bouillaud used a purely statistical criterion that provided evidence for a constant but not necessary correspondence. He was widely criticised for this propoasal by many scholars, and it was not until 1861 (with the publication of Broca's work) that there was a real shift in emphasis in the debate on cortical localization.[8]

On 21 February 1861 the French neurologist and anthropologist Broca gave a lecture to the *Societé d'Anthropologie* entitled *Remarques sur le siège de la faculté du langage articulé, suivies d'une observation d'aphémie (perte de la parole)*. In the lecture, he reported his observations of a patient named Leborgne who had suffered from epileptic seizures from an early age and had spent more than 20 years in the hospice of Bicêtre in Paris. During his hospitalization, the patient seemed to understand what was said to him perfectly well, but he was almost completely unable to speak: when someone spoke to him, he would only ever reply by repeating the monosyllable *tan* (he was in fact known by the name of *Tan*).

Ten years after this loss of language, the patient developed a progressive weakening of the muscles of the right arm leading to complete paralysis, and this paralysis gradually spread to the right leg, until the patient died at the age of 57. The autopsy of the brain showed a lesion in the left frontal lobe, especially in the third frontal gyrus of the cerebral cortex, which led Broca to conclude that, since the patient could not speak, this part of the frontal lobe must be responsible for normal speech production.

Many subsequent studies from autopsies have confirmed Broca's discovery and this area is now commonly known as Broca's area (in modern neuroanatomical literature it is also named "Brodmann area 44"), while the type of aphasia that derives from a lesion in this area is called Broca's aphasia.[9]

Broca began his lecture with a general reflection on semiotics, before going on to examine the well known issue of the loss of words due to damage to the brain. He spoke of a general language faculty – on which we will focus more widely in paragraph 3 – that in some pathological cases remains unaltered, although there are cases in which a brain injury can affect the articulated speech. To this impairment of speech Broca gave the name of «*aphemia* (alpha-privative, φημι = I speak, I pronounce); for it is only the faculty of articulating words that these patients lack».[10]

Such patients are capable of hearing and understanding the meaning of what is said to them. Their major difficulty is producing the methodical and coordinated movements that correspond to a particular syllable, with the result that they can only produce a very small number of articulated sounds, always the same and arranged in the same order, so that their vocabulary is constituted by a limited number of syllables.[11]

What has been destroyed in these patients – Broca said – is neither the language faculty, nor word memory, nor the action of the

nerves and muscles of phonation and articulation, but «a particular faculty, considered by Mr. Bouillaud to be *the faculty of coordinating the movements necessary for spoken language*, or, more simply, *the faculty of spoken language*, because without it, speech is not possible».[12]

One could then legitimately ask – Broca continued – whether aphemia «is the result of a *locomotor ataxia*, limited to that part of the central nervous system which presides over the movements of the articulation of sounds».[13] If it were, «the faculty lost by the patients is not an intellectual faculty – a part of the thinking section of the brain»; rather, it must be «a specific case of the general faculty of coordinating muscle action, a faculty that depends on the motor part of the nerve centers».[14]

Broca, however, avoided taking a stand on the issue of whether aphemia is a disorder of an intellectual type or a mere locomotion disorder.

The issue on which he seems to have had no doubt was the existence of a special faculty of articulate speech. It is a faculty that «can fail independently», and the fact that the other faculties close to it can remain unaltered demonstrates that it is «a faculty distinct from all others, in other words a special faculty».[15] Between 1861 and 1865 Broca studied eight Broca's aphasic patients, finding lesions similar to that in his first patient: this convinced him of the localization of articulate language in the third convolution of the left frontal lobe.[16]

A few years later a young German neurologist, Carl Wernicke, published a brief monograph entitled *Der aphasische Syntomencomplex. Eine psychologische Studie auf anatomischer Basis* (1874), in which he argued that the cerebral cortex is organized in areas with specific functions (language, memory, etc.), anatomically linked together in a sort of mosaic.

In the case of Broca's aphasia there is an injury in the area that corresponds to the motor images of words, so that patients present a motor aphasia, while in the cases studied by Wernicke the injury affects the area of the auditory images of the words.

Although hearing is still intact, such a case produces «the obliteration of the names [acoustic imagery] of all objects from memory. The concept itself, however, remains fully clear, for in most cases, the acoustic image of a name is of secondary importance with respect to the concept»,[17] and this is why we speak of sensory aphasia. The loss of memory of the sound images of the words means that patients are no longer able to name objects, people, events, and so on.

The fact that Broca and Wernicke published descriptions of two completely separate cortical areas, where in both cases injury to one involves an alteration of only one of two different "functions", gave great impetus to localizationistic investigations. Starting from the localization of language abilities, the prevailing idea became that other mental processes, even complex ones, could be located in relatively limited areas of the cerebral cortex.

The cerebral cortex was thus configured as an aggregate of individual centers, groups of cells which were responsible for all sorts of mental processes.[18]

Neurological research after Broca and Wernicke pursued a rather rigid localizationism, focused above all on those cases of patients who had a lesion confined to a particular area of the cerebral cortex which had caused an alteration of some specific type of psychic activity. At the beginning of the twentieth century, however, this rigid localizationism came to be seen as a theoretical position which was difficult to reconcile with clinical evidence, theoretical suggestions and experimental data which appeared to favour a different interpretation of the brain and mind.[19]

People began to ask whether there was a "one-to-one" relationship between a given brain area and a specific function, or whether several functions might not originate in the same area, or the same function be realized over several areas.

We shall not enter into the debate between localizationists and antilocalizationists, because it would lead us astray from the real purpose of this paper, which is – as we have

said in paragraph 1 – to focus on what Broca meant when he spoke of the general language faculty.

What we mean by "general language faculty": The contribution of Broca

Broca began his famous lecture talking about the existence of several types of language, using the term *language* in the sense of any system of signs (or code) that makes it possible to express ideas in a more or less intelligible or complete way: in fact, speech, mimicry, typing, picture writing, phonetic writing, etc., are all species of language. According to Broca,

> there is a general language faculty that oversees all these ways of expressing thought, and that can be defined as the faculty of establishing a constant relationship between an idea and a sign, no matter if this is a sound, a gesture, a picture or any other record. Moreover, each kind of language requires the working of certain *emissive* and certain *receptive* organs.[20]

He went on to say that the absence or destruction of this faculty renders impossible any kind of language, indeed

> congenital or accidental lesions of the receptive or emissive organs can deprive us of the particular kind of language that these organs contribute to, but if the general language faculty persists in us with a sufficient degree of intelligence, we are still capable of substituting another kind of language for the one we have lost.[21]

The faculty illustrated by Broca is therefore a general semiotic faculty, fixing a constant relationship between an idea and a sign. It associates an entity that is – so to speak – internal (what the Danish linguist Louis Hjelmslev defined as "the level of content"), with an entity that is external (sounds, handwritings etc.), or "the level of expression".

The words used by Broca recall those used by the Genevan linguist Ferdinand de Saussure in his *Course in General Linguistics*, also with reference to this faculty: «what is natural to mankind is not oral speech but the faculty of constructing a language, i.e. a system of distinct signs corresponding to distinct ideas».[22]

In human beings, therefore, there is a natural tendency – that could also be called innate – to associate something on the level of content to something on the level of expression.

Even before any historical-natural language comes into play with its particular determinations, human beings, solely in their perception and on the basis of their pre-linguistic intelligence (definable as generically cognitive and semiotic), are naturally inclined to make hypotheses concerning what Tullio De Mauro calls, more or less, «what is identified from an expressive point of view» and «what is identified from a semantic point of view».[23]

This is what happens to children during their first year of life, before they acquire the first words of a historical-natural language. It seems that children have a «broad, universally shared expectation», an innate expectation that «permits infants to link novel words (that are applied to objects) to commonalities among those named objects».[24]

Children are thus "driven" by a sort of universal expectation or semiotic vocation that leads them to connect objects or entities that surround them with the words of the historical-natural language to which they are exposed. How is this achieved?

Our aim here is to explore how the general language faculty referred to by Broca "comes to life", as it were. The term *general* should be integrated considering the Saussurian statement «what is natural to mankind», that is, taking into consideration the natural conditions that allow human beings who live in a community to put into practice their faculty of constructing a language or system of distinct signs corresponding to distinct ideas.

According to a naïve representation, certain objects in the world have a common nature, and human beings reflect this essence in

their concepts and spontaneously assimilate these objects in the same categories. The historical-natural languages simply add tags to meanings and references; in short, the development of meaning is simply a kind of training based on a series of ostensible definitions.

An object is shown to a child and its name is pronounced, producing a permanent association between the object name and all objects of the same class.

This conception of language as nomenclature was strongly criticized by Saussure and Wittgenstein, because it suggests that children already know a language but not that of adults, or, even more controversially, that they already have well formed thoughts even if they do not yet speak.

Already in ancient times a contrasting position emerged, which in modern times has come to be known as the formative theory of language. The following objections can be made to the conception of language as nomenclature: 1) each object has a plurality of characteristics, so that it can come under different categories; 2) human beings are able to recognize each of these characteristics and, therefore, they may form different concepts starting from their interests and experiences; 3) human beings must learn to communicate with other human beings and thus to give names to things, interacting with their peers in the historical-social communities to which they belong; 4) the language and the culture of origin allow them to construct meanings that shape, at least in part, patterns of categorization.[25]

These four issues stem from, and must be considered in terms of, one basic consideration: from the beginning of their existence, human beings show a tendency to think and to act within wholes, according to unitary blocks, identifying not only – as Aristotle maintained – similarities, contrasts and contiguities in time and space, but creating real, cognitive and experiential micro-universes.

In short, when children construct their experience in the world and develop their knowledge of it, they seem to be oriented, in a wholly natural way, towards perceptions and representations that are situational or – to use a term typical of artificial intelligence – towards scripts, micro-universes that allow us both to organize cognitive content and to represent concepts in our memory.

In this respect, scholars have also spoken of format, frames, scenes, patterns of events, etc., or of natural forms (as proposed by Vygotskij) or of forms of life (as proposed by Wittgenstein). The underlying concept is that of spatially and temporally organized cognitive structures that enable children to acquire linguistic symbols and gradually become full members of the linguistic community to which they belong.[26]

Establishing a constant relationship between a sign and an idea is thus the result of a complex and articulated process that concerns, at the same time, the origin and development of our experiences and practices of life as well as how our words, speech and knowledge develop, together with our ability to interact and communicate with the others.

Broca (on the neurological side) and Saussure (on the linguistic side) have the undoubted merit of having defined what is, in semiotic terms, the general language faculty. In this paragraph we have tried to outline under what conditions verbal languages (where the sign that expresses the idea is a sound) develop naturally and take shape in our daily lives; in the next paragraph we will see what happens when, in cases of aphasia, patients lose the use of words.

The general language faculty and the loss of words in aphasia

Experimental studies on aphasic patients have shown that in almost all forms of aphasia there are cases of anomia (or nominal aphasia or amnestic aphasia), i.e. a more or less marked difficulty in remembering the names of things, people, events, etc., although strictly nominal aphasia refers to cases in which patients present quite a fluent and grammatical linguistic performance, but have difficulty, when it comes to naming or spontaneous ver-

bal expression, in expressing words which convey lexical meaning, something that is encountered quite often in cases of Wernicke's aphasia (or sensory aphasia).

Rather than concentrate on the most compromised categories in cases of anomic aphasia[27] and keeping well aware of the great variability that exists among aphasic patients,[28] we will review four famous cases described in the literature on aphasia. These cases are particularly interesting in terms of illustrating the compensatory strategies implemented by anomic patients in order to overcome the *impasse* in which they are trapped when attempting to refer to external factors, their life history and experiences.

First of all we consider *Über Farbennamenamnesie* (1924) by Kurt Goldstein and Ahdémar Gelb. These authors present several cases of patients suffering from color anomia who are not able to grasp the categorical relationship between the concrete occurrence of a certain color and the more general category to which it the term refers.

Goldstein and Gelb describe several cases of anomic patients whose compensatory strategy, when someone names a color, is to answer referring to concrete cases, to personal experiences that they have had with respect to that specific color. Thus for example in the case of *black* they say "*What's black...*", "*coal is black...*" "*black shoes*", in the case of *red* they say "*Red as blood, blood is red*", in the case of *green* they say "*This is green, the grass is green*", and so on.[29]

These patients, in practice, are not able to refer to a principle of categorical order, so they act in a more "concrete" way, i.e. in a way closer to their life experiences, and this causes a change in their experience with the world of colors.[30]

Something similar happened to some of the aphasic patients described by Armand Trousseau. These patients, unable to remember the name of an object familiar to them, were nonetheless able to remember their use:

> We show them a spoon. – What is it? No answer. – Is it a knife? Sign of denial. – Is it a fork? Same sign. – Do you remember the name of the object that I am showing you? Same sign. – Is it a spoon? Very keen sign of affirmation. – So you don't remember the name of this spoon? Sign of denial. And it is the same for almost aphasic patients. Yet the singular thing is that, while they can't remember the name of the object, they remember perfectly their use. Showing them the spoon: "What is its use? They take the spoon and put it in their mouths to describe the use of this instrument".[31]

The decisive criterion in cases like these described by Goldstein and Gelb and by Trousseau is what Jean Piaget[32] calls operativity: the names of those objects and entities with which individuals interact and are familiar because they can use them, manipulate them, order them and turn them into something else are easier to access and are retained more easily in memory.

Consider now the case of Zasetskij, described by Aleksandr Romanovich Lurija in *The Man with a Shattered World*. After being seriously wounded by fragments of a bullet in 1943, causing a massive injury to the parietal-occipital brain area, he was afflicted by a sort of "fragmentation" that affected all aspects of his life.[33]

He had difficulty realizing what was around him, and he could not find the words he needed in his memory when he did realize. This "fragmentation" meant that he could not immediately unify the impressions into a whole, and therefore lived in a "fragmented" world.[34] As Zasetskij himself recalled:

> I'd already learned what a needle, thread, thimble, and material were for and had some vague notion of how to use them. But I couldn't for the life of me think of the names for these or other objects people had pointed out to me. I'd sit there stitching the material with the needle, completely unable to remember what the very things I was using were called.[35]

What Zasetskij has lost – in this case – is the scheme, the script of sewing, so that even the names associated with the objects and activities characteristic of this script have failed. Faced with the fragmentation of his life and of the world he knew, Zasetskij, in the phase of therapy following the aphasia, tried to make contact with any context whatsoever, with any real experience that might help him to find the necessary word. This proved possible when the language related to those particular objects, concrete actions and situations was "less aphasic".[36] Thus when Lurija asked Zasetskij what month they were in, Zasetskij failed to say *May* but he reeled off the 12 months of the year in the correct order.

As Hughlings-Jackson observed, there are some expressions - which he defined as *recurring utterances* (what today we would call *speech automatisms*)[37] - which in a large number of cases[38] are the result of associations of words and concepts which had been used very frequently by the patient before undergoing the aphasic deficit, and these residual expressions re-emerge and persist during the period of aphasia. Referring to Hughlins-Jackson, Sigmund Freud underlined the importance of recurrent utterances, taking into account all serial associations:

> On the other hand, a rare product of speech may prove highly resistant if it had acquired great force by being associated with great intensity. I referred to such instances earlier when discussing speech remnants ("recurrent utterances") which, according to Hughlings-Jackson, are last words. It is also noteworthy that series of words are better preserved than single ones, and that words remain the more easily available the more widespread their associations are. The former rule applies to series such as successive numbers, days of the week, months, etc. [...] Sometimes the whole series of associations can be recited, but not one particular part in isolation. [...] It even happens that people who are incapable of uttering a single word spontaneously, are able to sing a song perfectly correctly.[39]

While the four examples just described show compensatory strategies of a verbal type, aphasic patients (in particular those without semantic memory deficits) show also another type of behavior. Not infrequently, in fact, they are able to use drawings to communicate or to mimic what they would like to say. These behaviors provide a clear demonstration of the semiotic function of language, or better, of the existence, at source, of a semiotic faculty of more general kind, so that when one of the linguistic codes is compromised (i.e. oral speech) patients may use other "signs".

Conclusions

The four cases we have described in paragraph 4 show a tendency, typical of anomic patients, to refer – in the absence of a given word – to practical and operative experiences, just because – as we have seen – naming is influenced by familiarity with the object, in virtue of the concrete experiences accomplished with it.[40]

Serial associations, highly structured contexts etc. play a decisive role, since they help patients to find a way to overcome the lack of words. In fact in these cases we should speak not of "deficits" but of "positive phenomena": not only they do not hinder communication but they give an idea of the processes of a linguistic and experiential nature often implemented quite naturally by patients suffering from anomic aphasia.

In the behavior of the patient suffering from anomic aphasia, the use of concrete experiences and/or more or less broad, variously structured contexts indicates not only language deficits but compensatory strategies (or repair strategies) that show many similarities with those performed by children intent on acquiring an historical-natural language.

Just as children learn to speak and communicate with other human beings starting from shared contextual situations in which

they have experience of various language games, so patients suffering from aphasia – especially anomic aphasia – "lose" their words, but at the same time activate some special compensatory strategies (or repair strategies) that can allow them – depending obviously on the severity of the aphasic deficit – to produce linguistic expressions that reveal their natural tendency to behave in a holistic way, referring to more or less structured contexts and shared situations in which their experiences, their knowledge, their previous skills etc. can come into play.

In other words, both in the case of children acquiring their native language and in that of anomic patients who try to "hold onto" familiar and structured contexts when they cannot "find the words", we can observe similar linguistic-experiential paths.

The general language faculty – as conceived by Broca and later by Saussure – refers to the faculty of establishing a constant relationship between an idea and a sign. However, the way in which we usually associate something on the content level with something on the expression level is closely related to what is natural in human beings, that is the way we organize our knowledge, experiences in the world, etc., behaving in a holistic way.

The adjective *general* must always be considered in close correlation with the adjective *natural*, looking at the forms of life in which human beings construct their experiences, habits, knowledge, feelings, and so on.

Notes

[1] I would like to thank the two anonymous referees for their very valuable comments.

[2] A.R. DAMASIO, *Descartes' Error. Emotion, Reason, and the Human Brain* (1994), Penguin Books, London; ed. 2005, p. 8.

[3] See H. GARDNER, *The Shattered Mind. The Person after Brain Damage*, Vintage Books Edition, New York 1974, pp. 89-90; H. GOODGLASS, *Understanding Aphasia*, Academic Press, New York 1993, p. 14.

[4] See C. MORABITO, *La mente nel cervello. Un'introduzione storica alla neuropsicologia cognitiva*, Laterza, Roma-Bari 2004, p. 23.

[5] See C. CACCIARI, *Psicologia del linguaggio* (2001), il Mulino, Bologna 2011[2], p. 100.

[6] Our translation of: «une *force* particulière destinée à régir, à *coordonner* les merveilleux mouvements par lesquels l'homme, au moyen de la voix articulée, communique ses pensées, ses sentiments, et peint pour ainsi dire les mouvements de son âme», in J.-B. BOUILLAUD, *Recherches cliniques propres à démontrer que la perte de la parole correspond à la lésion des lobules antèrieurs du cerveau, et à confirmer l'opinion de M. Gall, sur le siège de l'organe du langage articulé* (1825), in: H. HECAEN, J. DUBOIS (éd.), *La naissance de la neuropsychologie du langage (1825-1865). Textes et documents*, Flammarion Éditeur, Paris 1969, pp. 15-31, in particular p. 18.

[7] Our translation of: «organe législateur de la parole», *ivi*, p. 19.

[8] See P. FABOZZI (a cura di), *La parola impossibile. Modelli di afasia nel XIX secolo*, Franco Angeli, Milano 1991, p. 18.

[9] See, for example, S.M. AGLIOTI, F. FABBRO, *Neurospicologia del linguaggio*, Il Mulino, Bologna 2006, pp. 97-99; G. LIBBEN, *Brain and Language*, in: W. O'GRADY *et al.* (eds.), *Contemporary Linguistics. An Introduction*, Bedford/St. Martin's, Boston-New York 2001, pp. 513-535, in particular pp. 518-519; L.K. OBLER, K. GJERLOW, *Language and the Brain*, Cambridge University Press, Cambridge (Mass.) 1999, 39 ff.

[10] P. BROCA, *Remarques sur le siège de la faculté du langage articulé, suivies d'une observation d'aphémie (perte de la parole)*, in: «Bulletin de la Société Anatomique», vol. VI, 2nd series, 1861, pp. 330-357 (en. trans. *Notes on the Site of the Faculty of Articulated Language Followed by an Observation of Aphemia*, in: P. ELING (ed.), *Reader in the History of Aphasia. From Gall to Geschwind*, John Benjamins Publishing Company, Amsterdam/Philadelphia 1994, pp. 41-49, in particular p. 43).

[11] See *ibidem.*

[12] *Ivi*, p. 44, italics in original.

[13] *Ivi*, p. 45.

[14] *Ibidem.*

[15] *Ivi*, p. 46.

[16] See P. BROCA, *Sur le siège de la faculté du langage articulé*, in: «Bulletins de la Société d'Anthropologie», vol. 6, 1865, pp. 377-393 (en. trans. *On the Site of the Faculty of Articulated Language*, in: P. ELING (ed.) *Reader in the History*

of Aphasia, cit., pp. 56-58, in particular p. 58).
[17] C. WERNICKE, *Der aphasische Syntomencomplex. Eine psychologische Studie auf anatomischer Basis*, Max Cohn & Weigert, Breslau, 1874 (en. trans. *The Aphasia Symptom-Complex: A Psychological Study of an Anatomical Basis*, in: P. ELING (ed.), *Reader in the History of Aphasia*, cit. pp. 69-89, in particular p. 77).
[18] See A.R. LURIJA, *Vyšše korkovye funkcii čeloveka i ich narušenija pri lokal'nych poraženijach mozga*, Izdatel'stvo Moskovskogo Universiteta, Moskva 1962 (en. trans. *Higher Cortical Functions in Man*, Tavistock, London 1966, p. 23).
[19] See C. MORABITO, *La mente nel cervello*, cit., p. 80.
[20] P. BROCA, *Notes on the Site of the Faculty of Articulated Language*, cit., p. 42.
[21] *Ibidem.*
[22] F. DE SAUSSURE, *Cours de linguistique générale*, Editions Payot, Paris, 1916 (en. trans. *Course in General Linguistics*, translation, introduction and notes by W. BASKINCON, McGraw-Hill Book Company, New York-Toronto-London 1966, p. 10).
[23] T. DE MAURO, *Capire le parole*, Laterza, Roma-Bari 1994, p. 59.
[24] S. WAXMAN, *Everything Had a Name, and Each Name Gave Birth to a New Thought: Links between Early Word Learning and Conceptual Organization*, in: D.G. HALL, S.R. WAXMAN (eds.), *Weaving a Lexicon*, The MIT Press, Cambridge (Mass.) 2004, pp. 295-335, in particular p. 295.
[25] See D. GARGANI, *Ontogenesi del significato, natura umana e realtà: per una teoria sociocostruttivista dello sviluppo linguistico e cognitivo*, in: «RIFL. Rivista Italiana di Filosofia del Linguaggio», vol. VI, n. 2, 2012, pp. 88-103. These arguments have been supported with varying degrees of radicalism throughout the history of philosophy by authors such as Locke, Humboldt, Saussure and Wittgenstein and, in times closer to us, by Piaget, Vygotsky, Nelson, Benelli, Deacon, Tomasello etc., who have made their contributions to the development of a socio-constructivist theory of meaning.
[26] See G. BASILE, *La conquista delle parole. Per una storia naturale della denominazione*, Carocci editore, Roma 2012, p. 52.
[27] See the numerous studies since the publication of H. GOODGLASS, B. KLEIN, P. CAREY, K. JONES, *Specific Semantic Word Categories in Aphasia*, in: «Cortex», vol. II, n. 1, 1966, pp. 74-89. See G. BASILE, *La conquista delle parole*, cit., 197 ff.
[28] See for example the descriptions of patients with a more severe impairment in naming concrete substantives than abstract ones, starting from the first description of a patient by E.K. WARRINGTON, *The Selective Impairment of Semantic Memory*, in: «Journal of Experimental Psychology», vol. XXVII, n. 4, 1975, pp. 635-657.
[29] K. GOLDSTEIN, A. GELB, *Über Farbennamenamnesie. Nebst Bemerkungen über das Wesen der Amnestischen Aphasie überhaupt und die Beziehung zwischen Sprachen und dem Verhalten zur Umwelt* (1924), in: K. GOLDSTEIN, *Selected Papers / Ausgewählte Schriften*, edited by A. GURWITSCH, EL.M. GOLDSTEIN HAUDEK, W.E. HAUDEK, Martinus Nijhoff, The Hague 1971, pp. 58-125, in particular p. 103.
[30] See *ivi*, p. 114.
[31] Our translation of: «Nous leur montrions une cuiller. – Qu'est-ce cela? Pas de réponse. – Est-ce un couteau? Signe de dénégation. – Est-ce une fourchette? Même signe. – Vous rappelez-vous le nom de l'objet que je vous montre? Même signe. – Est-ce une cuiller? Signe très-vif d'affirmation. – Vous ne vous rappeliez donc pas le nom de cette cuiller? Signe de dénégation. Et il en est ainsi de presque tous les aphasiques. Il y a pourtant cela de singulier, c'est que ne se souvenant pas du nom de l'objet, ils s'en rappellent parfaitement l'usage. En leur montrant la cuiller: "A quoi cela sert-il? Ils prennent la cuiller et la portent à leur bouche pour désigner l'usage de cet instrument"», in A. TROUSSEAU, *Clinique médicale de l'Hôtel-Dieu de Paris*, 3 voll., Bailliere et fils, Paris 1861-1868, vol. II, III ed. 1868, p. 678.
[32] See J. PIAGET, *Piaget's Theory*, in: P.H. MUSSEN (ed.), *Carmichael's Manual of Child Psychology*, vol. I, Wiley, New York 1970, pp. 703-730.
[33] See A.R. LURIJA, *The Man with a Shattered World. The History of a Brain Wound* (1972), Harvard University Press, Cambridge (MA) 1987, p. xv.
[34] See *ivi*, p. 32.
[35] See *ivi*, p. 48.
[36] A.R. LECOURS, F. LHERMITTE, *Clinical Forms of Aphasia*, in: A.R. LECOURS *et al.* (eds.), *Aphasiology*, Baillière Tindall, London 1983, pp. 76-108, in particular p. 77.
[37] See J. HUGHLINGS-JACKSON, *On Affections of Speech from Disease of the Brain*, in: «Brain», vol. I, 1879, pp. 304-330; vol. II, 1880, pp. 203-222 and 323-356; now in P. ELING (ed.), *Reader in the History of Aphasia*, cit., pp. 145-167, in particular pp. 151-152: «the Speechless patient may occa-

sionally swear. Indeed he may have a recurring utterance, e.g. "Come on to me", which is propositional in structure but not, to him, propositional in use». Moreover, the speechless patient can sing his recurring utterances (see *ivi*, p.158).

[38] There are also speech automatisms which may be due to the contribution of the spared right hemisphere and this is why not all automatisms may be considered repair strategies (as they have been intended by us in paragraph 5).

[39] S. FREUD, *Zur Auffassung der Aphasien*, Franz Deuticke, Leipzig-Wien 1891 (en. trans. *On Aphasia. A Critical Study*, International Universities Press, New York 1953, p. 88).

[40] In this context, see, among others, P. FEYEREISEN, F. VAN DER BORGHT, X. SERON, *The Operativity Effect in Naming: A Re-Analysis*, in: «Neuropsychologia», vol. XXVI, n. 3, 1988, pp. 401-415, in particular p. 411: «the role of operativity in naming performance of aphasic subjects is of considerable theoretical interest as it relates mental representations underlying speech production to those involved in action planning». See also p. 412: «both familiarity and age-of-acquisition also correlate with operativity, which might retain some of its explanatory power. Examinations of the ratings shows that operativity depends less on intrinsic properties of the object, such as being separable from context or being manipulable, than on the actual experience of the subject with it».