



**A small point on the philosophy of mind: Saussure's sign and  
brain lateralization**

**Um pequeno ponto da filosofia da mente: Signos Saussureanos e  
lateralização cerebral.**

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## Abstract

We propose that Saussure's *signifiers* must be processed in the left brain hemisphere (in right handed people) and the *signified* may be processed in the right. This proposition has consequences for understanding human cognitive phenomena and their pathologies, and can also be related to the passive and active process of thinking, as described by Karl Jaspers. Saussure studied signifiers and their relationships. He left the signified to be studied by psychologists, but there is no consensus about it. According to some linguists, the signified, or the meaning, is the specific activity or succession of bodily states related to each signifier. Learning is the process of linking a signifier (a represented object) to a signified or meaning (a specific activity). However, human beings can represent signifiers autonomously because words and drawings are easily produced with small movements and have syntactic, referential and logical rules of combination. If they are processed in the left hemisphere, the meaning (the signified) is only found when the right hemisphere is reached. The right hemisphere can also work independently, as for instance, when we imagine a story which has to find the words in the left hemisphere. The complex relationship between the hemispheres through the *corpus callosum* is decisive for telling stories and having self-consciousness.

**Keywords:** signs, signifier, meaning, brain lateralization, intentionality, philosophy of mind.

## Resumo

Propomos a hipótese de que os significantes de Saussure sejam processados no hemisfério esquerdo do cérebro (em pessoas destras) e que o significado possa ser processado no direito. Esta proposição tem consequências no entendimento dos fenômenos cognitivos humanos e nas suas patologias, e pode também ser relacionada com o processo de raciocínio passivo e ativo, descrito por Karl Jaspers. Saussure estudou os significantes e as suas relações. Deixou o significado para ser estudado por psicólogos. No entanto não há consenso sobre o assunto. De acordo com alguns linguistas, o significado é a atividade específica, ou sucessão de estados corporais relacionados com cada significante. A aprendizagem é o processo de ligação de um significante (um objeto representado) a um significado (uma atividade específica). Contudo, os seres humanos podem representar significantes de forma autónoma porque as palavras e desenhos são facilmente produzidos através de pequenos movimentos e têm regras de combinação sintáticas, referenciais e lógicas. Se forem processados no hemisfério esquerdo, o significado é encontrado apenas quando o hemisfério direito é atingido. O hemisfério direito também pode trabalhar independentemente, como por exemplo, quando imaginamos uma história que tem de encontrar as palavras no hemisfério esquerdo. A complexa relação entre hemisférios através do corpo caloso é decisiva para contar histórias e ter autoconsciência.

**Palavras-chave:** sinais, significante, significado, lateralização hemisférica, intenção, filosofia da mente

### Linguistics and brain asymmetry

At the age of 22, Ferdinand de Saussure was asked by a professor of the University of Leipzig if he was not, by chance, related to the great Swiss linguist of the same name, well-known for the book “*Memoire sur les Voyelles*”. In fact, he had written this book one year before. In the latter part of his life, Saussure tried hard to reformulate his theories of Linguistics. Few students attended his difficult lessons, but those who did eventually became the most influential linguists in Europe. Saussure’s “*Cours de Linguistique Générale*” was posthumously published by them.

Saussure’s main formulation was the division of the linguistic sign into two parts: the *signifiant* [signifier] and the *signifié* [signified]. The signifier should be the object of linguistic study, while the signified, closer to the concept, should be studied by psychologists. The signifier is easily defined as the mental image of the

vocalized or written word. The signified has been repeatedly discussed by linguists. The source of misunderstanding is a well-known but apocryphal diagram which does not appear in the original manuscript and was only inserted by the publisher of the “*Cours de Linguistique Générale*”. This diagram, showing the written word *arbre* and the drawing of a tree, led to the erroneous idea that the signified was the named object or its image<sup>1</sup>.

However, Saussure explicitly denied this conception of language as a “nomenclature”. As Umberto Eco (1990, p. 25) explains, a drawing or an object can also be a signifier, and its relationship with a verbal sign is similar to the relationship of a word with another equivalent word. It can only be the *referent* of the signifier, but not the signified nor the concept. In Peirce’s Semiotics, a sign is a triadic relationship between the *representamen* (equivalent to the signifier), the *object* and the *interpretant*. For instance, as Charles

<sup>1</sup> See *Cours de Linguistique Générale*. Édition critique préparée par Tullio de Mauro (Saussure 1985), pp. 97-99, also notes 129 (p. 439) and 132 (p. 441).

Morris (1938) points out, a map is a *representamen*, which refers to a territory (the *object* or referent) and permits our dislocation from one point of the territory to another (the *interpretant*). Several philosophers, including Wittgenstein (1995, p. 207), think that the meaning (i.e., the signified) is the human use of the sign. So, as Eco concludes, Peirce's *interpretant* is the same as Saussure's *signified*, i.e., the way we can use the *signifier* part – a word, an image or an object – of a sign. To clarify, we can say that the meaning or signified of a chair – word, drawing or object – is the real or imagined possibility of sitting down and leaning back, while the meaning of a stool excludes leaning back (Pio-Abreu, 1998). In contrast, the relationship between a signifier, like a word, and its referent (an object or drawing), as with the relationship between a word and other words, can help us to discover the signified, but should not be confused with the actual signified. Linguists call this relationship between

signifiers *value* or *sense* (referential sense, syntactical sense, contextual sense)

Saussure and Peirce were not aware of the work of Paul Broca with aphasic patients, nor did they have the chance to know of the recent discoveries about the functional lateralization of the human brain, but we can say that they envisaged them. In fact, aphasic patients who have their left cerebral hemisphere damaged (if they are right-handed) show difficulties in dealing with words and their syntactical, referential and categorical relationships. However, they do not lose the meaning of the words, which they can understand correctly; they may not be able to name an object (loss of the referential sense) but they can use it and they can also describe its usage by gestures or other words. In contrast, right hemisphere damaged patients have no difficulty with words and their relationships, sometimes becoming more talkative and fluent, but they frequently misunderstand the consequences of their discourse and

mistake the use of objects. They also have a number of interesting symptoms described with several names. In general, there is difficulty in recognizing places, faces, postures and their own palsy; a failure to notice objects in certain places relative to the body; and a duplication of familiar things which can lead to delirious ideas. There is also a measurable semantic difficulty (Castro Caldas, 1999, pp. 224-234). A patient reported by Oliver Sacks (1985, p.30) could describe the colour, texture and shape of a glove, but claimed that it served to keep coins of different sizes in. Only after putting it on his hand did he discover that it was a glove. Thus, only after the appropriate use did he grasp the concept. These facts can be interpreted in the sense that the left hemisphere (in right handed people) processes the signifier (and its relationships – the sense), while the right hemisphere processes the signified (Pio-Abreu 1997; Pio-Abreu, Ferreira & Januário, 2015; Crow 1998).

Saussure was right when he distinguished these two parts of the sign.

Functional and anatomical asymmetry of the cerebral hemispheres has recently been intensively studied (Sperry, 1981; Popper & Eccles, 1983; Gazzanica, 1995; Cutting, 1997; Lindell, 2006), but rarely has it been related to Saussure's work. However, this heuristic approach seems important to the understanding of the human mind. Although certain primates can show some preference for one hand or the other in some performances, they do not have such an anatomical asymmetry of the brain. In humankind, left/right handedness has a genetic origin. Timothy Crow (1999) assumes that this heredity is a consequence of a transposition from the X to the Y chromosome that occurred after the separation of the lineages that led to the chimpanzee and Homo Sapiens and, more recently, with the beginning of language, a paracentric inversion of the transposed region in the Y chromosome. This genetic

mutation has been maintained because it confers a natural advantage. What advantage? – The ability to deal with signs, tell stories and have a self-conscious mind. As Timothy Crow points out, one minor disadvantage is the possibility of having psychosis, i.e. misunderstanding reality.

### **The signifier and signified in animals**

All animals, including humans, deal with objects in their territory and also with other animals, namely those of the same species. Their skills depend on instinct and learning, and seem organized to maintain survival. Besides the motor responses, they show several components of what we call emotions: fear, surprise, anger, joy, pain. In humans, these emotions correlate with subjective feelings which can only be described in the first person, since nobody else can experience them. These feelings have the same nature as *qualias*, for example, the sensation of

redness when looking at a red thing. Do other animals have these feelings and *qualias*?

Nobody can answer this question, since animals do not report their experiences. However, the physiological and cerebral activities they have are similar to humans. As far as we know, both animal and humans are engaged in a succession of bodily and cerebral states when dealing with external objects. These states may not be named, but each one has a qualitative difference from the other. Some of these states and their sequences may be repeated as long as the objects are the same or similar. However, while the external objects can be defined by spatial dimensions, the states of the body are successive; therefore, they only have a temporal dimension. In other words, while the objects in the environment may be simultaneously present, the states of the organism may not: once a state is present, the previous one disappears. This fact has deep consequences for understanding the

mind and its phenomena: recognizing, learning, remembering and ascribing meaning. In short, we can assume that every time we speak about an object as a signifier, it is present in space; every time we speak about its use or signified, it evolves over time<sup>2</sup>.

The link between the representation of a specific spatial object and the related movement (the transition of states over time<sup>3</sup>) is made in the *telencephalon* of vertebrates. The *Hippocampus*, where place-cells have been discovered (O'Keefe & Nadel, 1978), is the original structure of the vertebrate's telencephalon. Surrounding objects, represented by their smells, drive homing salmon on their great journey to the river source where they were born (Hasler & Larson, 1970). In mammals, visual and acoustic pathways lead other representations of surrounding

objects to the telencephalon and its place-cells. Everywhere a representation of a significant<sup>4</sup> object reaches the brain, there is a link between this representation and a sequence of inner states of the organism. This link may be innate or learned. However, once it is active, the presence of the represented object can evoke the corresponding sequence of states and this latter sequence can evoke the representation of the object.

In fact, significant objects must have their representation in brain neurones and synapses. When an animal is engaged in a specific action, for instance, looking for something, this thing must be previously present as a brain representation. When it eventually finds the desired object, the perception matches the representation and recognition takes place. Once recognized, the object may promote another sequence of states. Thus, before being recognized, the object has a virtual (represented) presence in the brain,

<sup>2</sup> To better understand this duality between space and time, and life as "duration" (over time), it is interesting to review the work of the French philosopher Henri Bergson (1988; 1990; 1996). He opposed the Cartesian concept of *extension* (in space) with his own concept of *duration* (in time), and asserted that a common philosophical mistake was confusing the *successive* with the *simultaneous* and *quality* with *quantity* (Bergson, 1988: 164).

<sup>3</sup> It is heuristically useful to substitute the vague notion of movement or activity with a sequence of states as conceptualized in robotics (Cf. Aleksander and Burnet, 1983).

<sup>4</sup> The role of the neurotransmitter Dopamine in giving salience or meaning to a stimulus is now known (Schultz, 2002). Thus, a neutral object becomes significant.

while the states and their sequence are actually present. Nevertheless, we can ask if the sequence of states may also have its specific representation in the brain.

The hippocampus is a good candidate for keeping the representation of recent sequences of states. The possibility of acquiring episodic memory depends on the integrity of this cerebral structure. In mammals, the hippocampus projects to (and receives from) cortical modules and these, via association areas, are related to prefrontal cortical regions. Thus, the hippocampus is surrounded by successive brain layers where each specific sequence of states may be represented (Bontempi & Durkin, 2007). The prefrontal lobe is the last layer, and the possibility of representing experience, including the sequence of bodily, physiological and cerebral states, depends on the complexity of the brain. In developed primates, this is surely possible. Thus, some form of "thinking", i.e., to represent objects (the signifier) and the corresponding sequence

of states (the signified), may be possible, as Kohler (1925) describes in the "problem solving behaviour" of chimpanzees. However, this form of thinking is strongly dependent on the objects being present in the environment and/or on the state of the animal at that moment. Moreover, the signifier and signified are mutually dependent. The animal may "think" while dealing with things or himself, but it can not be a solipsistic "thinker". It cannot misunderstand reality.

A special case of dealing with surrounding objects is when these objects are animals of the same species. George Herbert Mead (1934, pp. 77-78) analysed interactions between organisms, where a gesture made by one provokes a given response in the other; in its turn, the gesture made by the second one provokes a response in the first. This is a true conversation, where the gesture is a symbol (signifier) and the response of the other animal is the interpretation, therefore the meaning (signified), of the gesture.



These interactions are common in more evolved animals and regulate their social organization. They also modify the meaning of other objects, such as food, present in the context of the interaction. However, the signifier belongs to one organism and the signified (meaning) belongs to the other. None of them can control all the process which, therefore, is not self-conscious. The novelty in relation to static objects is that each gesture made by the same organism can have a specific meaning, and that the signifier can have a more complex representation, as a movement or a succession of states of the observed organism. The tendency to imitate other organisms gives more complexity to this process.

### **The signifier and signified in humans**

The importance of imitation in superior primates was recognized with the discovery of mirror-neurons in chimpanzees (Rizzolatti & Arbib, 1996;

Gallese, 2001). Human children imitate very early on (Meltzoff & Decety, 2003). They have the advantage of their bodily plasticity, so that they can imitate virtually everything. Piaget (1978, pp. 84-85) has described how they imitate an object when it challenges them. Thus, this object may be represented without it being present. The utilization of the thumb instead of mother's nipple is an everyday example. For Piaget, these gestural representations are the first form of the signifier, and so, precursors of vocal words.

Beginning with representational gestures, children and adolescents also learn to model things (the first exercise in modelling would have been with primitive chipped stones), draw objects, and write words. All these exercises are ways of representing objects. They are executed with the hands, and manual preference begins to develop. Thus, in right handed people, these representations of objects tend to occupy, once they are conducted by neurons, the contra-lateral left hemisphere.

They are all signifiers with specific relationships, which also occupy the same hemisphere. Words and their syntactic relationships, which can represent all the known world, are also processed in this part of the brain. Thus, we can say that the world is represented in the left hemisphere. The rest of the brain – the right hemisphere – tends to be occupied with the use of, or experience with, the represented objects, i.e. the meaning or signified.

In contrast to surrounding objects, drawings, gestures and written or spoken words – the human signifiers – are accessible every time they are needed. Small gestures or movements are enough to produce them, sparing the necessity for the presence of real objects. They have their signified in the right hemisphere, but can be reproduced (by imitation) or produced without a known signified. By their relationships, they can also construct new meanings. Furthermore, they can be used in interactional conversations. However, while in the animal

conversation, the signifier belongs to one organism and the signified or meaning belongs to the other, in the conversation through linguistic signs, signifier and signified may both simultaneously belong to the same organism, since the first is produced and represented in the left hemisphere, and the second in the right. Both are shared by the interlocutors, who can also have their inner conversation. Apart from conversation, this is why solipsistic thinking is possible in human beings.

Describing the world in words or another language, humans are also able to describe other people. They can describe observed behavior, but they are also able to describe the mental states and subjective feelings of others. This ability, known as “Theory of Mind”, is acquired from childhood onwards (Baron-Cohen, Leslie, & Frith, 1985; Wellman & Lagattuta, 2000) and may be dependent on imitation, language and self recognition. Thus, humans can tell stories about other people,

and this is important in rendering their behavior predictable when dealing with them. Similarly, they can also tell stories about themselves. A story describes people's states and their transition, behaviors, conversations and other events occurring over time. However, once it is told through words or other signifiers, it becomes a narrative which can be kept in several media – written sheets, drawings, tapes, or known by heart – and reproduced every time it is needed.

Thus, since a narrative is composed of signifiers, it is a spatial thing, just as an object is. In the same way as the thumb of a baby, it can be used to represent things and events which may not be present at that time. This “spatialization” of temporal life is needed to make comparisons and permit logic and self consciousness. For instance, while we are looking at a pen, we can know that we are looking at a pen, as another person could know, and we can also know that we know we are looking at

a pen. This self reflection is the basis of self-consciousness.

Signifiers, their relationships, logical reasoning, explanations and narratives can be processed with some independence of their meanings, since rules of syntax, semantics and logic are embedded in their production. In fact, when telling, listening, writing or reading a story, we may feel it to a greater or lesser degree, or we may not understand anything in spite of reproducing the whole story or reasoning correctly. This latter event occurs when the left cerebral hemisphere (in right-handed people) is working alone, and this is what Jaspers (1963, pp. 208-212) called the passive thinking process. Only from time to time do we need to resort to the signified in order to know if the story has a link with common experience, if the reasoning corresponds to its objective or if we want to grasp a deeper signification. If the signified is processed in the right hemisphere, the link between signifier and signified is made

through the *corpus callosum*, which is the bridge between the hemispheres.

In contrast to the passive (or mechanical and associative) thinking process, Jaspers also described an active and purposeful process of thinking, related to governing ideas, goal-formation and determining tendencies. If this process evolves independently of signifiers, it may be a chain of signified or meaningful elements. There is no syntactic or logical organization, but an analogical combination or a learned sequence of states. It is something close to daydreaming and imagination. This way of thinking depends on motivational purposes and may be processed autonomously in the right hemisphere. It can be unconscious or it can become conscious once it resorts to the signifiers of the left hemisphere through the corpus callosum. Animals can also think in this way but without self consciousness, since they may not resort to linguistic signifiers.

## Conclusion

What we call the mind is perhaps an image of very complex processes that drive our organism through time. It is not a thing or an object, like a stone, a flower or an organism. However, we can describe it (and I am doing this) by explanations and narratives, i.e., chains of articulated signifiers kept in books or other media. Thus, we can deal simultaneously with events which in fact belong to time, i.e., once one is present, the previous one disappears. This illusion of simultaneity, made possible by the use of signifiers, may create the illusion that the mind is a thing, a kind of imaginary double of every organism.

These issues are studied in the Philosophy of Mind, which also considers the difference between animal and human minds. Intentionality<sup>5</sup> is a key point to

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<sup>5</sup> While the meaning follows a perception, an intention precedes an action, a verbal emission or some kind of movement towards an object. However, they have the same nature. For instance, if the meaning of a chair is the real or imagined possibility of sitting down and leaning back, the same expected action as intentionality is what leads us to look for a chair. The starting point of phenomenology is the subject and his intentionality. Thus, phenomenologists assert that "intentionality gives the meaning" (Virgilio Ferreira, 1964: 27). Merleau-Ponty (1945) speaks about *significant intentions*. Moreover, if you are going to send a message, you have some intention about its effect on

analyze and distinguish possible minds (Dennett, 2009). Thus, we can assume that an animal, a human being or a robot has intentions, desires, expectations, beliefs or other mental states. Sometimes it also has desires or beliefs about the beliefs or desires of other beings (second order intentionality). Adult humans can have second and superior levels of intentionality. When seeing the Shakespeare play Othello, the audience must *understand* (4<sup>th</sup> order) that Iago *intends* (3<sup>rd</sup> order) that Othello *believes* (2<sup>nd</sup> order) that Desdemona *wants* (1<sup>st</sup> order) to run off with Cassio. In his turn, Shakespeare *intended* that the audience should *understand*... and so on, therefore working at fifth order intentionality (Dunbar, 2007).

Children acquire second order and superior intentionality (Theory of Mind) after the second year of life, when they are also able to deal with language (De

Villiers, 2000). The child has to distinguish the self from the other, and to learn that others' beliefs can be different from hers, and that similarly she can lie. To learn this, children play games of pretence and misleading, after imitating and representing objects or other people. The differential nervous activity in the right or left hemisphere seems important for some of these distinctions (Keenan *et al.*, 2000; Decety & Chaminade, 2003; Decety & Grèzes, 2007). They can therefore work with the left or the right hemisphere, frequently with both, creating a complex relationship between the two through the corpus callosum. However, only language can maximize these relationships. In fact, the corpus callosum is thicker in literate than in illiterate people (Castro-Caldas *et al.*, 1999).

When reading this paper, perhaps the reader may not understand all the meanings, in spite of recognizing the signifiers and their intrinsic rules. This does not matter, because the left

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the receiver. If the communication is efficient, the meaning for the receiver must fit your intention.

hemisphere is economical and does not constantly importune the right brain. If it did so, a lot of time would be spent on reading. However, the text is written and each time the reader peruses it, new meanings (the signified) will appear. If, on the other hand, you are tired, your right brain intends to sleep or makes you daydream; in this case, new words or images may be superimposed on and confuse the text that your left brain is trying hard to read.

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