

The self-domesticated animal and its study

Estudio sobre el animal autodomesticado

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ABSTRACT

The qualifier biosocial invites us to fuse all the disciplines dealing with people, from zoology and neuroscience to anthropology and historiography. The neuroscientist's job is to discover the neural systems and processes involved in feeling, planning, or controlling social processes, that is, strings of events affecting other people. Social cognitive neuroscience broadens and updates classical social psychology, in studying not only behavior but also its internal source when it is not automatic but driven or at least influenced by emotion or volition.

This paper suggests that psychology is a biosociological science rather than either a chapter of zoology, as biologism has it.

Keywords: psychology, neuroscience, social cognitive neuroscience, epistemology, biosociological science.

RESUMEN

El calificativo biosocial nos invita a fusionar todas las disciplinas que se ocupan de las personas, desde la zoología y la neurociencia hasta la antropología y la historiografía. El trabajo de los neurocientíficos es descubrir los sistemas y procesos neurales involucrados en el sentimiento, la planificación o el control de los procesos sociales, es decir, en las cadenas de eventos que afectan a otras personas. La neurociencia cognitiva social amplía y actualiza la visión clásica de la psicología social, al estudiar no sólo el comportamiento sino también su fuente interna cuando no es automática sino impulsada o por lo menos influenciada por la emoción o la volición. Este artículo sugiere que la psicología es una ciencia más que un capítulo de la zoología, como lo pregona el biologismo.

Palabras clave: psicología, neurociencias, neurociencia cognitiva social, epistemología, ciencia biosocial.

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INTRODUCTION

Although the official name of our species is *Homo sapiens*, some people prefer *Homo faber*, *loquens*, *adorans*, or *ludens*. Still others opt for the self-domesticated, problematizing, soul-owning, political animal, God's imitation – or even, as the famous televangelist Billy Graham put it, “we are fallen creatures living in a fallen world.”

I prefer to be known as a **social animal**, for it encompasses some of the previously listed nicknames. In addition, it suggests that all the disciplines that study us are **biosocial** rather than biological (naturalism), spiritual (idealism), moral (Hume), or human – as if the other sciences were unhuman.

The qualifier **biosocial** invites us to fuse all the disciplines dealing with people, from zoology and neuroscience to anthropology and historiography. The same qualifier warns us not to try and circumvent the social, by jumping from the individual brain to economic transactions, as if these were individual processes like digesting and navel gazing. And the qualifier **social** in “cognitive and affective neuroscience” focuses on the neural aspect of social behavior, from love and play to trade and war.

Feeling love or hatred are intimate, but marrying and trading are social. Actually, all human behavior except scratching one's head is social to some extent because it happens in a social context and leaves traces on the environment as well as on the actor's brain.

That sociality defines us and other simians is obvious from the way social exclusion affects us. Thus, autism is a serious disease, solitary confinement a harsh punishment and a kind of torture, and deafness a painful shortcoming because it isolates individuals even more than blindness or muteness. Nor is the deprivation of social contact damaging just to people. Puppies reared in cages develop into abnormal adults; and hungry capuchin monkeys prefer the company of conspecifics to food.

To humans, sociality is much more than gregariousness: being social involves crafting or maintaining social systems or “circles” of many kinds. And human social systems are more than flocks or other groups of conspecifics: it involves inventing, observing or altering norms of behavior and institutions such as schooling, teamwork, mutual aid associations, and more.

Adverse social circumstances may sicken in various ways. For example, loneliness and forced social exclusion due to discrimination, arbitrary subordination, economic insecurity unemployment, or restricted access to public health facilities may cause anxiety, stress, depression, social phobia, eating disorders, and self-harm. No wonder that emigration can be deeply unsettling, that psychologists study the “broken heart syndrome” following widowhood. Uprooting harms people as well as trees. Just think of the tragedies suffered by the millions of refugees from persecutions, ethnic

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cleansings, and wars. They suffer not only from biological deprivations but also from having left their erstwhile social circles.

The neuroscientist's job is to discover the neural systems and processes involved in feeling, planning, or controlling social processes, that is, strings of events affecting other people. For instance, she may wish to discover whether a particular action was free (spontaneous) or compelled by an external stimulus, as well as the brain subsystems activated or inhibited during that action. The result of such study may be used to design and implement behavior norms and institutions aiming at either encouraging or discouraging actions of that kind. In general, we ought to learn before acting.

Social cognitive neuroscience broadens and updates classical social psychology, in studying not only behavior but also its internal source when it is not automatic but driven or at least influenced by emotion or volition.

The most popular topics in recent social cognitive and affective neuroscience are self-recognition, self-reflection, self-knowledge self-control, free will, and the corresponding deficits. The study of reflecting one one's current experience has led to a closer study of MPFC (BA10), the medial prefrontal cortex (see Lieberman, 2007). This is the region of the PFC that is disproportionately larger in humans than in other primates.

For this reason, a biological reductionist might propose calling humans **batens**, or owners of the BA10 region. But sociological reductionists might then argue that our species deserves to be known as **Homo credulus**, as it takes humanness to worship cruel gods and trust deceitful politicians.

Besides, recent research has cast serious doubts on the existence of a particular part of the human brain in charge of sociality (Singer 2012). It would seem that nearly all of our brain is social, even though one region specializes in feeling nociceptive pain (one's own), another in empathic pain, and so on. In the human brain, localization combines with coordination (Bunge 2010: 166 ff). This is why the ticket is systemism rather than either individualism or holism.

A FORMULA FOR THE TYPES OF MENTAL ACTIVITY

The anomalous size of the BA10 region in humans is related to the importance of internally focused processes versus externally focused ones. These differences may be compressed into the formula $M = E + B + EB + BE + BEB$, where **M**, **E** and **B** designate the intensity of mental activity, **E** that of the automatic response to external stimulus, and **B** that of the controlled response. The combinations of the two main kinds of process are **EB** (exo-endo) and **BE** (endo-exo). **EB** stands for the environmentally biased mental construction, whereas **BE** represents perception biased by intellectual processes. Sensory deprivation is represented by $E = 0$, whereas $B = 0$ stands for the blank state. The following section will list a few examples of each of the four categories.

Since neither of the three variables in question is well defined, the previous formula is so far only a mnemonic device. Still, it also summarizes a whole research project: that of properly defining all three variables. In particular, **B** would presumably be defined in terms of such parameters as neuronal firing frequency and synaptic plasticity.

A further function of the same formula is that it encapsulates the two main classical alternatives to the current approach: **B** = 0 or behaviorism, and **E** = 0 or the mind-over-matter doctrine.

The former school is that of Thomas Aquinas, Hume, Condillac, Mill, Watson, Skinner, and Vigotsky, whereas the latter or internalist school is that of Plato, Augustine, Berkeley, Maine de Biran, Freud, Merleau-Ponty, Eccles, Popper, Chomsky, and Pinker. The philosophical concomitants of these trends are empiricism and spiritualism respectively.

Regrettably, most historians of philosophy repeat the idea that the formula "There is nothing in the intellect that was not previously in the senses" was invented by the British empiricists, in particular Bacon, Locke, and Hume. To begin with, far from being new, the said principle was held by all the schoolmen belonging to the Aristotelico-Thomistic school. Secondly, Bacon stated explicitly that, far from resembling ants, that only gather what they find, humans resemble honeybees, in that they transform into honey and wax the pollen they gather. Third, Locke

acknowledged that mathematical knowledge does not derive from sense impressions – which is why some Locke experts have called him a ratio-empiricist. Only Hume was a radical empiricist, as shown by his rejection of Newton's theories, which went far beyond appearances. And, because of his monarchical and racist opinions, he lagged far behind the radical fringe of the French Enlightenment.

Clearly, social cognitive neuroscience fits neither of the traditional philosophical trends, for it places cognition and emotion in the brain, and puts the brain in its social context. Thus, perception is sensitive to social pressure, but it occurs in the brain. Don Hebb's classical experiments on sensory deprivation, and Jean Piaget's on the constructive nature of memory, learning and thinking, support the current view of the brain as a **tabula rasa** (blank slate) at birth, but thereafter as a creative organ, always ready to read, misread, or ignore external stimuli, as well as to imagine ideas of many degrees of abstraction. Anyone who has suffered hallucinations caused by a stroke will bear witness to the frightening inventiveness of a brain free from environmental controls.

It has been conjectured that each kind of process is in charge of its own kind of neural circuitry (Bunge 1980). The automatic processes, such as the unconditioned reflexes, proprioceptive sensations, tasting food, falling asleep and waking up, would occur in neural systems whose cellular components are held together by "rigid", or rather elastic, synaptic connections, some

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of which are inborn. By contrast, the plastic neural systems would be those where controlled processes occur – or, in the ambiguous parlance of the day, they would “mediate” the learned patterns.

“Roughly, Automatic = Inborn, and Controlled = Learned. But the automatic/controlled distinction is not a dichotomy, for some automatic processes are plastic. For instance, children can be trained to control their bowel movements – something that chimpanzees cannot. Even the brainstem, a phylogenetically very old brain organ, is plastic. Indeed, the opto-kinetic reflex, that stabilizes images in the retina as the animal navigates in its environment, can learn to adjust to drastic environmental changes, such as confinement into a cage.” (Liu et al. 2017).

It has become customary to say of brain organs that they mediate or subserve their specific functions, as in “brainstem neurons mediate (or subserve) innate motor behaviors.” But if organ A does B, one should not say that A “mediates” B, nor that A “subserves” B, for there are no intermediaries between organs and their functions, and the latter do not gratify their organs. Ordinarily we say that hands grasp, not that they “mediate” or “subserve” grasping. Talk of mediation or subserving in cognitive neuroscience is both bad science and bad grammar. Another rather popular expression is “instantiate”. Actually, the visual system sees and the auditive one hears, just as legs do the walking and lungs the breathing. None of these parts of the body is a means to an end or goal, and none of them instances or exemplifies a generalization. Straight talk is always preferable to circumlocution.)

To understand a process we must find out **what** it is and **where** it occurs. The brain imaging techniques help solve the latter problem, but to tackle the former problem neuroscientists must deploy all the physiological and biochemical techniques elaborated since the Scientific Revolution, along with the biochemical ones invented since the beginning of the 19th century. For example, to find out the mechanism of social isolation, and thus that of social reinsertion, it has been found necessary to follow the trajectory of dopamine molecules in and out of the dorsal raphe nucleus in the brain stem – the cusp of the spinal cord (Matthews et al. 2016). In turn, the uncovering of that trajectory involves the electrophysiological techniques invented in mid-19th century by Emil Du Bois Reymond. This outspoken materialist and atheist who started his scientific career studying electric fishes – a subject that most corporate-minded academic administrators would find unpromising and thus unworthy of support.

RANDOM SAMPLE OF FINDINGS

Let us list a few typical findings of social cognitive neuroscience – an exercise that should emphasize how much the **neuro** approach to the mental and behavior contributes to transforming the psycho black box into a translucent box allowing us to peek into its mechanisms.

1/ Spontaneous processes. Spontaneous or self-started processes are those that occur without any external inputs. Feeling a headache, dreaming, having a sudden idea, and exercising free will are familiar examples of processes of this kind. Presumably, they are not localized or, better, they may occur in different brain regions. Moreover, although these processes are not stimulus-bound, most of them, in particular self-consciousness, pride, shame, and the wishes to succeed and to be well thought of are likely to have been learned in the course of social interactions. In any event, they violate the stimulus-response schema and they are not “computed” either, so they are counterexamples to both behaviorism and information-processing or computational psychology.

2/ Automatic processes. The raw perceptions and feelings, as well as the conditional reflexes, are the best-known examples of this category. Pavlov’s dogs that salivated upon hearing a gong strike that used to accompany the delivery of food, and Skinner’s study of the pigeons that danced when their seeds containers were filled, have been amply vulgarized, but only as late as the first half of the 20th century. Only the mechanist philosophers, from Descartes to La Mettrie, argued that animal behavior is automatic. Some present day philosophers, namely the upholders of the computer or information-processing psychology, such as Putnam and Fodor, have adopted the same view, though replacing the mechanical automaton, such as Vaucanson’s ingenious duck, with the electronic computer.

The computer view of the mental is at variance with the well-known facts that computers work only when fed algorithms, that emotions are notoriously unruly, and that social life evokes such emotions as empathy, compassion, love, and hatred, all of which occur in neural networks involving the amygdala, a subcortical organ likely to have emerged much later than the neocortex, and whose volume correlates with social network size and complexity (Bickart et al. 2011). In general, whereas the tendency for personal electronic gadgets is to miniaturize, neocortex size has been increasing with group size (Dunbar 2009).

3/ Controlled processes. Imitation is one of the best-studied mental processes since Gabriel Tarde’s once-popular book on groupthink (1890). Imitation research received a sudden boost when Giacomo Rizzolatti and colleagues (2004) at Parma University discovered the mirror neurons in the macaque’s inferior parietal cortex. Since then, similar neuronal systems have been located in humans and in some birds. These studies have confirmed the hypothesis that simians and other species possess a “theory of mind” – the name that David Premack and Guy Woodruff (1978) gave the ability of imputing feelings

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and beliefs to others. A rough equivalent is the *Verstehen* or empathic understanding that Wilhelm Dilthey imputed to the students of social matters.

Of course, it is wrong to call *theory* the capacity to understand the minds of others. So far, it is only an ability waiting for a theory. And it is not clear whether a synonym for 'empathy' is really needed. What is clear is that the ability in question is not mind reading but "reading," or rather interpreting, outward or behavioral *indicators* of mental processes. It is also obvious that such studies have not only enriched animal psychology but have also enhanced our respect for simians and domestic dogs.

Further investigations of the neural sources of empathy using functional magnetic resonance imaging has revealed the participation of much more than mirror neurons. Indeed, the spontaneous, intuitive or preanalytic understanding minds of others is so important in social transactions, that in humans it engages no less than five brain "areas."

4/ Exo-endo processes. Data driven research is an instance of a thought process initiated by a striking observation, that is, one that clashes with received wisdom or just fills a gap in our body of knowledge. The end product of this process is also known as a chance discovery or lucky finding.

Actually there is an element of luck, good or bad, even in the most carefully designed observation or experiment, as we are always bound to miss some variable or other. In addition, it is well to keep in mind Louis Pasteur's wise remark, that "Chance favors only the prepared mind." For example, the ancient Chinese astronomers-astrologers saw and admired Eta Carinae, this extremely brilliant star, but only recently has it been learned that it is actually composed of two stars with a total mass of about 100 solar masses, and that its colossal explosions result from nuclear reactions in their interior.

5/ Endo-exo processes. All the free rational choices and decisions, as well as the resulting actions, are spontaneous or self-initiated processes occurring in the PFC. One of the most familiar experiences of this kind is free will, that is, volition not controlled by external stimuli, as when, after careful consideration, we follow a course of action congruent with our moral principles, even if we realize that it is likely to harm us.

Hypothesis-led scientific research belongs to this category. Indeed, the projects of this kind are backed not only by the usual philosophical presuppositions, such as realism and intelligibility, but also by specific guesses, such as the possible binding of the molecule being investigated with special receptors on the membrane of the target cell. Such assumed specificity guides the research, which is then anything but an erratic trial-and-error search.

Presumably, concussions, strokes and other severe brain lesions, as well as deficits in neurotransmitters due to malnutrition or excessive alcohol consumption, will translate into abnormal mental or behavioral symptoms, from apathy and recent memory deficits to poor scholastic achievement and

disastrous political policies and actions. A pioneering investigation of the strong negative correlation between malnutrition and abnormally thin cortex thickness, and the corresponding poor scholastic achievement of Mexican children (Cravioto et al. 1966) was revealing, yet still hardly known to the international developmental psychology community. It is recalled here mainly to emphasize the usefulness of science in the detection of social issues and the elaboration of social policies to resolve them (Navarro and Muntaner 2014).

6/ Exo-endo-exo processes. In addition to the unidirectional processes listed above, we have loops of the EBE type. An obvious case of this kind is the **hurrah** shout expressing the joy felt when watching a goal made by our soccer team. Its dual, **Schadenfreude**, is socially and morally very different from healthy joy, but presumably it engages the same neural systems in addition to the vocal one.

Another familiar case of an EBE loop is the so-called Thomas theorem. This is summed up in the formula **"People do not react to facts but to the way they perceive facts."** For example, we often buy merchandise, or vote for politicians, whose "image" has been manufactured by publicity agencies that have embellished the product in question.

CONCLUSION

In conclusion, the simian brain is highly social, and some regions of it are more susceptible than others to social stimuli. But, as the sensory deprivation experiments showed in the 1950s, the waking brain acts spontaneously all the time even in the absence of external stimulation, though it tends to hallucinate. The normal brain interacts with its immediate environment as well as with the rest of the organism. This finding suggests that psychology is a biosociological science rather than either a chapter of zoology, as biologism has it, or a purely social science, as sociologism imagined. In fact, the recent trend in psychology is towards merger or convergence rather than towards independence, let alone reduction.

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Artículos de colaboradores extranjeros

BIBLIOGRAPHY

Bickart, Kevin C., Christopher I. Wright, Rebecca J. Dautoff, Bradford C. Dickerson & Lisa Feldman Barrett. 2011. Amygdala volume and social network size in humans. *Nature Neuroscience* 14: 163-166.

Bunge, Mario. 2012. Wealth and well-being, economic growth, and integral development. *International Journal of Health Services* 42: 65-76.

———. 2010. *Matter and Mind*. Boston Studies in the Philosophy of Science, vol. 287.

Cravioto, J., E. R. Delecardie & H.G. Birch. 1966. Nutrition, growth and neurointegrative development. *Pediatrics* 38: 319-72.

Dunbar, Robin I. 2009. The social brain hypothesis and its implications for social evolution. *Annals of Human Biology* 36: 562-572.

Ibañez, Agustín, Eugenia Hesse, Facundo Manes, & Adolfo M. García, 2017. Freeing free will: A neuroscientific perspective. In Mario Bunge, *Doing Science* (Singapore: World Scientific Publications), Appendix 1.

Lieberman, Matthew D. 2007. Social cognitive Neuroscience: A review of core processes. *Annu. Rev. Psychology* 58: 259-89.

Liu, Bao-hua, Andrew D. Huberman, Massimo Scanziani. 2017. Cortico-fugal output from visual cortex promotes plasticity of innate motor behavior. *Nature* 538: 383-387.

Matthews, Gillian A., Edward H. Nieh, Caitlin M. Vander Weele, Craig P. Wildes, Mark A. Ungless, Kay M. Tye. 2016. Dorsal raphe dopamine neurons represent the experience of social isolation. *Cell* 164: 617-631.

Navarro, Vicente, and Carles Muntaner, eds. 2014. *The Financial and Economic Crises and Their Impact on Health and Social Well-being*. Baywood Publishing Co.

Singer, Tania. 2012. The past, present and future of social Neuroscience: a European perspective. *Neuroimage* 61: 437-449.

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