03. Commonplaces in Clinical Linguistics

03.05. The modular view

Fodor's work on modular cognitive organisation (1983)[1] was well received by both the generativist models of the time (government, ligament and derived) and by cognitive neuropsychology. Cuetos (1998) summarises the basic premises of this tendency as follows:

- **modularity**: it is accepted that the cognitive system is organised in modules that take care of specific tasks (what researchers are unable to agree on is the quantity, nature and inter-relation of such modules);
- **isomorphism**: modular cognitive entities have of necessity a biological correlation consisting of groups of neurons and neuronal circuits;
- **fractionability**: brain lesions can destroy certain modules without causing the whole system to break down;
- **substractivity**: the verbal conduct of a damaged patient is the result of the language processing system less (in the sense of subtraction) the damaged modules.

Another underlying premise is the acceptance of the so-called **computational metaphor**. Agustín Romero (1998)[2] explains the general context of appearance of cognitive models, relating them to the development of cybernetics and the science of artificial intelligence:

> *"cognitive models, as they are known today, emerged as a result of external social and technological influences far removed from the academic or applied world of psychology (...). Specifically, theoretical and technological advances, mainly in English-speaking countries (USA and Great Britain), on topics such as information, information technology, computers, etc. -what Rivière (1991) calls knowledge technologies or Simon (1973) calls artificial sciences- were key influences that motivated psychologists to overturn the behaviouralist models that had been popular up till that time. (...) Engineers, physicists and mathematicians were needed to build machines, and psychologists were the best qualified to make in-depth studies of the mental tasks that those machines might be able to do, although neurologists, linguist and even philosophers and anthropologists could also do it".*

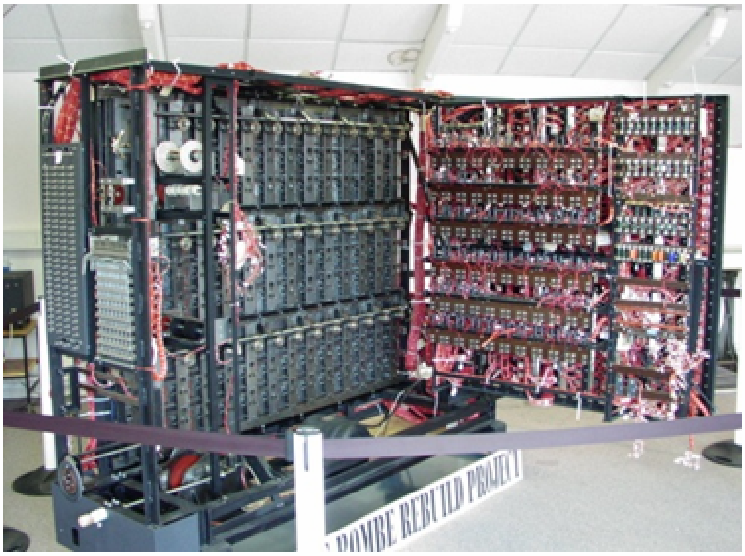
An important landmark in these new developments was the "Turing machine":

> *"Turing suggested that machines could be designed to behave intelligently. To do this, he used the human brain as an analogy to describe the machine's features. If human intelligence is enhanced with learning, the same could be done with a machine, that is, its 'intelligence' could be organised. Such machines would imitate people and some of their functions and behaviours. (...) Turing suggested that electrical circuits of computational machines could imitate the nervous system, as they are capable of transmitting information from one place to another and storing it". (Romero 1998: 419)*

[1] Fodor, Jerry (1983): La modularidad de la mente (The modularity of the mind), Madrid: Morata 1986.
[2] Romero, Agustín (1998): "El papel de las nuevas tecnologías del conocimiento y de la información en el surgimiento de la psicología cognitiva" (The role of new technologies of knowledge and information in the rise in cognitive psychology), in F. Tortosa (Ed.): *Una historia de la psicología moderna*, Madrid: McGraw-Hill, 417-432.

Imagen de la Máquina de Turing en EPISTEMOWIKIA

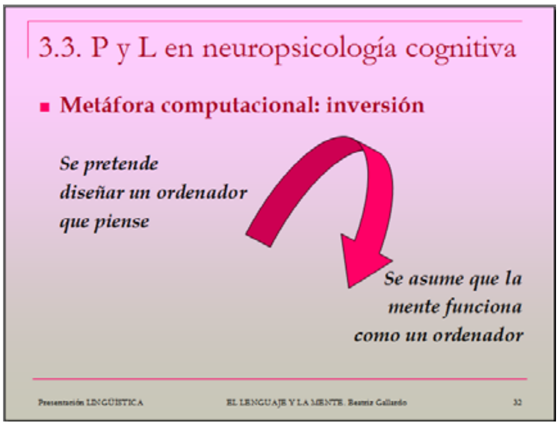
http://campusvirtual.unex.es/cala/epistemowikia/index.php?title=Portada



http://campusvirtual.unex.es/cala/epistemowikia/index.php?title=La_m%C3%A1quina_de_Turing/La_teor%C3%ADa_de_la_computaci%C3%B3n_y_la_M%C3%A1quina_de_Turing

What is interesting, and highly significant for the later development of cognitive neuro-psychology, is the way objectives change so that the computational metaphor appears as a result of an epistemological jump that is difficult to explain: the initial objective of building machines like brains gives way to the concept of the brain as a machine.

[Computational metaphor: inversion
The design goal is a computer that thinks.
The assumption is that the mind functions like a computer]



Together with this epistemological jump, the cognitive model sometimes takes on another radical approach, which directly affects the way language is thought about. This has sometimes led to the radicalisation of modular interpretation when combined with a strong version of localisationism; according to these positions, what Searle calls "Strong cognitivism" (1984)[3] becomes the foundation of formalist linguistic models, disconnected from the communicative paradigm. **Searle** argued that formal computing programs are perfect examples of syntax, but that they lack semantics:

> *"The question we wanted to ask is this: 'Can a digital computer, as defined, think?' That is to say, 'is instantiating or implementing the right computer program with the right inputs and outputs, sufficient for, or constitutive of, thinking?' And to this question, unlike its predecessors, the answer is clearly 'no'. And it is 'no' for the reason that we have spelled out, namely: the computer is defined purely syntactically. But thinking is more than just a matter of manipulating meaningless symbols, it involves meaningful semantic contents. (...) If it really is a computer, its operations have to be defined syntactically, whereas consciousness, thoughts, feelings, and all the rest of it involve more than syntax. Those features, by definition, the computer is unable to duplicate, however powerful may be its ability to simulate. The key distinction here is between duplication and simulation. And no simulation by itself ever constitutes duplication". (Searle, 1984: 42-43).*

The information processing done by a computer is not comparable to that done by a person, as a person passes through a series of mental states that the computer can **simulate** but not **duplicate**; this is what Searle calls "processing of information by itself" (1984: 57). For Searle, defenders of the radical version of cognitivism continually confuse these two information processings, which forces them to argue for an intermediate computational level that acts as a bridge between neuronal circuits and mental circuits; but according to Searle this third level is unnecessary, as there is a biological cause that allows the direct correlation between the neuro-physiological and the cognitive.

The other qualitative jump which is difficult to explain assumes that a modular cognitive system of necessity requires grammar to be **organised into modules**, converting grammatical components, of necessity interconnected, into isolated modules equipped with the famous "informative encapsulation".

This extrapolation clearly reinforced the undoubted formal and descriptive brilliance of generativism, but it unfortunately relegated to mere anecdotes the repeated findings that evidenced simultaneous linguistic processes and functions in many patients with impairment. The basic reasons can probably be found in an attempt to safeguard the supposition of mind/brain isomorphism. In this respect, the following quote may be useful:

> *"The idea here is that these anatomic structures are related to the computations in which they are involved. The brain machinery is not just one arbitrary way of implementing the processes it realizes, as, for example, any hardware computer configuration can realize almost any computer program or piece of software. The claim is that, instead, the hardware reveals aspects of the program. 'Neuronal structure is information' (...) In other words, it may be that the neuronal structures themselves teach us about aspects of the computational processes that are laid down in these structures". (Pulvermüller 2002: 9)*[4]

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[3] John Searle (1984): *Mentes, ciencia, cerebros (Minds, brains and science)*, Madrid: Cátedra.

[4] Pulvermüller, Friedemann (2002): *The Neuroscience of Languages. On Brain Circuits of Words and Serial Order*, Cambridge: University Press.

Despite this, even taking on board the basic presuppositions of modularism, we should remember that this view reduces language to grammar, and this poses the question of how such modularism affects pragmatics.

When studying the fundamental pragmatic categories, such as the speech act or implicature, Kasher and his group in Tel Aviv University argue that pragmatics is not a module in terms of how Fodor defined this concept (Kasher 1994)[5]:

> *"pragmatics does not constitute a modular system"*

However, the same author deals with the possibility that some pragmatic categories do have this modular nature and he also argues that Fodor's modularity does not necessarily mean there is independence between components:

> *"Pragmatic phenomena such as forces of speech acts, deictic expressions and conversational implicatures have each been the subject matter of an apparently independent branch of pragmatics. The question, therefore, naturally arises, whether the apparent mutual independence of these branches of pragmatics is a result of some methodological decision to discuss phenomena in abstraction from their interrelations, or is it rather a manifestation of an underlying substantive independence of each of the different pragmatic phenomena. Naturally, the issue of the substantive independence of some components of pragmatics can take the form of the problem is the modularity of the related systems of pragmatic knowledge.*
>
> *However, the relation between the intuitive notion of substantive independence and the technical notion of modularity is at least slightly more complicated that it seems".*

He proposes that pragmatics functions as a central system of knowledge (not as a specific module or domain) that generates different domains:

> *"We assume that a central system of knowledge is governed by abstract, general principles that apply to different domains and that its embodiment takes the form of a representation manipulation device that has access to the central store of beliefs held by the person at the time."*

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In summary, when considering the positions that defend the modular view of language and grammar, it is advisable to treat their statements in a relative sense; even accepting that language is a module of the cognitive system, its internal organisation cannot be conceived from such modular arguments, as language components are constantly interconnecting.

[5] Kasher, Asa (1994): "Modular Speech Act Theory: Program and Results", in S. L. Tsohatzidis (Ed.): *Foundations of Speech Act Theory: Philosophical and Linguistic Perspectives*, Routledge: London/New York, 312-322.