

# FODOR'S MODULARITY OF MIND AND FOREIGN LANGUAGE ACQUISITION: A CRITICAL READING

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- **ABSTRACT:** In the context of psychological theories assuming an internal structure of mental representations, Fodor (1983) proposes a mandatory informationally encapsulated autonomous processing of specifically linguistic input, maintaining that cognitive skills are neurally localized. He advances the hypothesis of a vertical and modular psychological organization underlying biologically coherent behaviors. This paper offers a critical reading of Fodor's theoretical position in relation to some aspects of Foreign Language Acquisition (FLA), calling into question untenable claims as to information processing, mental representation and perceptual analysis. In view of factors other than grammatical affecting FLA, a strictly modular view of sentence understanding is disputed while a radical connectionist perspective is also found fault with. It is argued that a compromise position might better account for the complex phenomenon of foreign language acquisition.
- **KEYWORDS:** Modularity of mind; mental representation; foreign language acquisition (FLA).

## Introduction

Different theoretical attitudes concerning the processing of linguistic acoustic signs are made evident in the current debate in the studies of the mind between connectionist perspectives and traditional symbolic models of cognition, particularly modularity. The difference can be

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seen in the ways these theoretical perspectives treat issues of mental representation and of the role assigned to the interaction of processing units, the latter being neglected by modular perspectives.

In the context of psychological theories assuming an internal structure of mental representations, Fodor (1983), a strong advocate of the modularity perspective, proposes a mandatory, informationally encapsulated and autonomous processing of specifically linguistic input and advances the claim of the neural localization of cognitive skills. This paper aims at a critical reading of Fodor's theoretical position by (1) calling into question some untenable claims as to information processing, mental representation and perceptual analysis and, (2) discussing the implications of the modularity perspective for foreign language acquisition, particularly English. Before an examination of Fodor's theory in relation to FLA is carried out, a definition of basic concepts and terminology makes itself necessary for a full appreciation of the arguments here put forward.

## **Definition of basic concepts and terms**

Let us begin with the notion of modularity, which is the very core of Fodor's theoretical position. What Fodor (1983, p.37) takes to be the most important aspect of modularity is what he calls the informational encapsulation, which he sees in a "natural" connection with a fixed neural architecture (p.117). Modularity refers to the encapsulation of the different types of information (e.g. phonetic, syntactic, semantic, lexical) resulting in the inability of one component or module of the processing system to make use of relevant information contained in another module. Fodor thus refuses cognitive penetrability of input vertical systems (p.74), arguing for the modularity of portions of the language understanding system, a concept presupposing the composition of processing systems as autonomous subsystems, sharing characteristics of vertical faculties.

The term vertical was coined by Fodor to refer to faculties which correspond to specific brain mechanisms and display domain specificity, being distinguished by reference to their subject matter. Vertical faculties are opposed to horizontal faculties, which are functionally distinguishable cognitive systems whose operations cross content domains.

While horizontal faculties (typical of connectionist views of information processing) are creative cognitive processes exhibiting the interaction of such faculties as memory, imagination, attention, sensibility and perception, vertical faculties are distinct psychological mechanisms corresponding to distinct stimulus domains, thus being unaffected by feedback from any information available to the subject.

In Fodor's view, a cognitive module is domain specific, innately specified, hardwired, autonomous and not assembled. Domain specificity refers to the vertical characteristic which Fodor assigns to a cognitive module whose operations do not cross content domains. Being innately specified means that the structure of a cognitive module is not formed by some sort of learning process or put together from some stock of more elementary subprocesses but already exists as part of the architecture of the mind in such a way its virtual architecture maps directly onto its neural implementation. Being hardwired is a property that refers to the association of the module with specific, localized and structured neural systems. As for autonomy, modules do not share horizontal resources of, say, memory, attention or whatsoever, with other cognitive systems. If one assumes, as Fodor does, that input systems are modules, then one necessarily assigns the properties of modules to input systems, which makes the claim problematic, to say the least.

Because Fodor considers the horizontal, central processes inaccessible to scientific investigation ("it is only the modular systems that we have any hope to understand") (1983, p.38), he bans them from this theory as they are taken to be nonmodular. As Fodor argues (1983, p.83), central processes – problem solving and the like – are characterized by cognitive penetrability, being thus unencapsulated and consequently not plausibly viewed as modular. The notion of penetrability implies that input processes are importantly affected by the subject's beliefs concerning contextual or background information, which runs against the claim put forward by Fodor that input systems are informationally encapsulated thus not crossing content domains. In fact, the only associative relation Fodor allows for is a relation at a level of representation sufficiently superficial to be insensitive to the semantic content of the entities involved. As an illustration of this point, Fodor offers the example of the associative relation among lexical forms between "spy" and "bug" to guide lexical access. The next section presents some common criticisms of Fodor's views.

## **Some criticisms of Fodor's views**

Fodor's position, which postulates 1. structured representations, 2. structure-sensitive mental process, and 3. an individuated class of input analyzers which are distinct from central cognitive mechanisms (*ibidem*, p.43), is questioned by many theorists committed to different views of the processing systems and of the nature of the mind.

An example is Gasser's criticism (1990, p.179): "it [Fodor's view] suffers from a very unhuman-like brittleness": As linguistic and conceptual entities are assigned in an all-to-one fashion to categories, rules typically apply in a fixed sequence, and deviations from expected patterns are not handled well, if at all. Gasser argues for the connectionist architecture which, in the most orthodox version, recognizes no combinatorial structure in mental representations and denies the existence of discrete symbols and rules as such, embodying theories of the mind based on the interaction of large numbers of neuron-like processing units.

Without subscribing to the orthodox connectionist view (evidences offered by aphasiology favor specialized and localized centers) I would like to call into question Fodor's proposal for an encapsulated, autonomous and mandatory processing system, focusing on the issue of foreign language acquisition.

Assuming that input systems are informationally encapsulated implies the acceptance of the claim that their operations are in some respects unaffected by feedback from any information available to the subject. As Fodor's argument goes, a system can be autonomous by being encapsulated and by not having access to facts other systems know about. In fact, Fodor (1983) refuses "the cognitive penetrability of input systems" (p.774) and the interaction between input analyses and background knowledge (p.73).

This theoretical perspective does not seem to hold when it comes to real processing by real human beings. Perception of novelty does NOT depend solely on bottom-up-to-top perceptual mechanism: Modules "leak" or overlap and the confirmation function for input systems must rely on information the organism internally represents.

The autonomy advocated by Fodor, which refers to constraints on the information flow, cannot sensibly be accepted. As input processes ARE crucially affected by the subject's appreciation of semantic context or "real world" background, not only syntactic information is used in

syntactic parsing, but there is a relationship of the semantic memory with the world knowledge held by the subject, which is brought to bear in the processing of incoming information.

By refusing contextual facilitation of lexical access (ibidem, p.80), Fodor does not consider the existence of a module for the elaboration of mental representations integrating crossed information, which accounts for his claim that 'large memories are searched slowly' (p.70). This is another aspect which does not stand close investigation: A subject is, in fact, sensitive to what he knows and he can get at what he knows about the world very fast.

One more fact has to be considered: language has a creative and dynamic aspect to it. However, this is denied in the modular approach. As a consequence, modularity bans creative processes from the scope of science. In fact, thought and language cannot be separated on those grounds: perception (or production) of verbal sounds is impossible without meaning or intentionality or creativity, aspects crucial to the very nature of language processing and producing. This last issue is explored in the following subsection.

## **The modularity of mind and Foreign Language Acquisition**

In the context of Foreign Language Acquisition (FLA), the modular approach also encounters serious resistance as it suffers from limitations in its account of information processing and in its refusal to acknowledge the importance of contextual and background information in perceptual analysis. If contextual factors are important in first language acquisition they are even more crucial in foreign language acquisition.

It is an established fact that modules overlap in the acquisition of a Foreign Language (FL). Some examples illustrating this point can be found in Hatch et al. (1990, p.699), where approaches to Second Language Acquisition are brought up for discussion in terms of systems for language production:

For instance, we know the errors in third-person singular present tense may be either a representation problem in morphology or a phonology problem (the difficulty of consonant clusters) or both. A modular approach to phonology would simply ignore the overlap.

What is highlighted in this quote is the fact that a radical modular view cannot account for acquisitional matters, the isolation of a morphological module and of a phonological model being an example of the disputability of such a claim.

Another example of module overlapping refers to the representation of definite and indefinite articles and pronouns, which cannot be accurately studied apart from the discourse framework in which they occur. These forms depend on the role of the noun phrase within a particular context (see Hatch et al., 1990, for a thorough discussion).

Concerning the integration of information in the interpretation of an incoming stream of sounds, some theorists go as far as to say that "not only knowledge must be activated in the execution of these processes, but also opinions, attitudes, values and emotions" (van Dijk & Kintsch, 1983, p.334). The hearer, it is claimed, has to keep track of his or her own wishes, interests, goals and plans, which exert a monitoring function on all the other components of the comprehension process. All these factors do affect comprehension and are involved in it in one way or another. If this is true of native language processing, the implications for foreign language processing are even more serious: here, the individual has to draw upon any and all information available, which he/she has to integrate into the interpretation of the incoming stream of sounds, which, by force of their "foreign" nature, are harder to process. The theory of the informational encapsulation of input systems cannot account for the processing of a foreign language in view of its refusal to acknowledge the interaction between input analyses, contextual information, background knowledge and attitudes, as well as the values and emotions of the individual striving to acquire this new form of knowledge.

Another issue meriting closer investigation is the mandatory quality assigned to the operations of the input system in modular approaches. Fodor (1983) claims that the kind of processing operations observable in spoken word recognition are mediated by automatic processes which are obligatorily applied: "you can't help hearing an utterance of a sentence as an utterance of a sentence" (p.52), or "you can't hear speech as noise even if you would prefer to" (p.53). So goes his argument.

The immediate implication of this claim is the belief that processing takes place independently of the subject's will. When it comes to meta-recognition, however, such a claim displays an open flank. As Scliar-Cabral (1991, p.135) points out, the issue of unknown languages is not accounted for in Fodor's scheme: what happens is a rejection of

whatever speech stream which cannot be processed due to lack of knowledge of the respective system of verbal language. In this case, speech is heard as noise and is rejected. In reality, there is a gradation from automatic to creative processes, as Scliar-Cabral (p.127) points out: the lower the process, the more unconscious, automatic, mandatory and culturally-unbound it is, as happens, for example, with phonological and morpho-phonemic rules. In view of this, the mandatory property would have to be revised, at least in relation to foreign language processing.

## **Final remarks**

Fodor's claims that 1. there is one distinct component of the human cognitive system responsible for identifying the grammatical characteristics of a sentence, a module devoted to syntactic processing alone, and that 2. syntactic information represents a distinct type of input do not stand close scrutiny. As the reflections made in this paper have tried to demonstrate, a strictly modular view of sentence understanding suffers from serious limitations when it comes to language acquisition matters, particularly in relation to foreign language acquisition: the extremist modular view, which denies any leakage and overlapping among the components, constitute an unacceptable orthodox position. On the other hand, however, radical connectionist approaches to the studies of the mind, which deny any kind of mental architecture and recognize no combinatorial structure in mental representations, are equally inadequate to offer a satisfactory account of FLA.

It is suggested here that a compromise between the two extremes could go beyond the narrow confines of the informational encapsulation approach while allowing for some kind of mental organization. In other words, maybe perhaps some modularity in connectionist models. This, it is here argued, might provide acquisitional studies with a more feasible account for such a complex phenomenon as the processing of incoming streams as well as the production of foreign sounds.

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- **RESUMO:** No contexto de teorias psicológicas que assumem uma estrutura interna das representações mentais, Fodor (1983) propõe um processamento mandatório e autônomo, com encapsulamento de informação, para "input" especificamente lingüístico, apresentando a hipótese da existência de uma organização modular e vertical, subjazendo comportamentos biologicamente coerentes. Este trabalho apresenta uma leitura crítica da posição teórica de Fodor, em relação a certos aspectos do processo de aquisição de língua estrangeira, questionando algumas afirmações insustentáveis quanto ao processamento de informação, à representação mental e à análise perceptual. Face a fatores que transcendem os aspectos gramaticais no processo de aquisição de língua estrangeira, questiona-se a visão estritamente modular de processamento de sentenças, mas, ao mesmo tempo, critica-se a perspectiva conexionista radical. Argumenta-se que uma posição intermediária poderia dar conta, com mais propriedade, do complexo fenômeno de aquisição de língua estrangeira.
- **PALAVRAS-CHAVE:** Modularidade da mente; aquisição de língua estrangeira.

## References

- CARLSON, G. N., TANENHAUS, M. K. (Ed.) *Linguistic structure in language processing*. Kluwer Academic Publishers, 1989.
- FODOR, J. A. *The modularity of the mind*. Cambridge, MIT Press, 1983.
- FODOR, J. A., PYLYSHYN, Z. Connectionism and cognitive architecture. *Cognition*, v.28, p.3-71, 1988.
- GASSER, M. *Connectionism and universals of Second Language Acquisition*. *SSLA*, v.12, p.179-99, 1990.
- HATCH, E., SHIRAI, Y., FANTUZZI, C. The need for integrated theory: connecting modules. *Tesol Quarterly*, v.24, n.4, p.697-713, 1990.
- SCLIAR-CABRAL, L. *Introdução à psicolingüística*. São Paulo: Ática, 1991.
- VAN DIJK, T. A., KINTSCH, W. *Strategies of discourse comprehension*. New York: Academic Press, 1983.