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Exploring Jerry Fodor's modularity of mind as a tool for comprehending mental architecture

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Abstract
The modurality of mind hypothesis is regarding the innate mechanisms that constitute the cognitive architecture of the mind. It is a hypothesis as to how the modules function in the mind as innate sub-systems with specific domains of their own. Jerry Fodor in the 1960s developed theories that have been influential across disciplinary boundaries. The concept of modularity has time and again been figured in recent deliberations to qualify its evidence of utility, as a tool for theorizing about mental architecture. There is a need to explore the varied dimensions, involved in different modules of the mind.

Keywords: mind, modules, modularity, mental architecture, representation

Introduction

Fodor was of the opinion that a 'Representational Theory of Mind', needs to be defended as per which thinking is a computational process over and above mental representations that are physically exhibited in the brain. The mental representations are internally structured like sentences in a language, in that they have both a syntax and degree of semantics. Fodor defends an influential hypothesis about mental architecture, that low-level sensory systems such as language are 'modular' in the sense that they are encapsulated with information from the higher-level systems responsible for belief, decision-making and so on. In 1981, Fodor portrays functionalism as another way of thinking of brain that is neither dualist nor realist. The functionalist reasoning reflects current work in brain research, language and so forth. All these are basically concerned with data input at a theoretical level. Be that as it may, functionalism attempts to clarify and explain this technique for reflection.

It further perceives that it is feasible for a wide range of entities, from people to machines to spirits to have mental states. Hence, as Fodor states that for functionalism to exist, framework of a brain depends not on what stuff it is made of but how the stuff is basically assembled.

Functionalism as explained by Fodor has few underlying theories on which it was based: 1) Dualism; 2) Radical Behaviorism. Dualism faces the issue of clarifying how a non-physical substance can collaborate with physical substances. A dualist may contend that we don't even truly realize how physical substances connect. In any case, Fodor says, in any event we meet with numerous instances of physical causation in experience. Non-physical causation may basically be a relic of the dualist hypothesis. Additionally, dualism is by all accounts contradictory with the act of brain related framework as there is not ample proof and reason to anticipate that experiments should work in a non-physical domain in that capacity (Fodor, 1991) [3].

For a radical behaviorist, there is no issue regarding mind-body communication as there is no mental causation occurring. It has consistently appeared to be incomprehensible, since the possibility of mental causation is profoundly embedded in language and the manner in which we comprehend each other (Goldman, 1998) [4]. Notwithstanding, the most grounded contention against behaviorism is that brain research has found that psychological states and procedures are required particularly to clarify human conduct. All things considered, Philosophers were attracted to behaviorism as it was by all accounts the main option in contrast to dualism. Afterward, a theory was looked for after, that considered mental causes. This prompted development of two other options: 1) Logical Behaviorism and 2) Central State Identity Theory. Consistent behaviorism maintains the importance of mental states.

It investigates the significance of a psychological state to carry on with a certain goal in mind, which implies each psychological state is proportional to an if-then arrangement. For instance: 'Samuel is thirsty' implies that if water is available chances are at that point Samuel would drink it. The downside of behaviorism is that it gives a realist record of mental causation. A psychological reason is essentially the manner to act with a particular goal in mind. In any case, logical behaviorist offers a semantic view in contrast to the radical behaviorist. Thus, the logical behaviorist is truly in no more grounded position than the radical behaviorist as it is only the semantic form of radical behaviorism (Roth G, 2001) [5]. It truly doesn't acknowledge the presence of mental causes.

Fodor's view as the Central State Identity Theory takes into consideration mental states to be indistinguishable from neuro-physiological states. It takes into consideration mental states to connect causally in any event, when they don't issue in conduct. In contrast to the behaviorist, who says that these terms either allude to nothing at all or to boost reaction relations? It doesn't state that our terms for mental states mean a similar thing as our terms for neuro-physiological states. Consequently it isn't available to the sorts of protests that one may raise to consistent behaviorism, for instance when we state we have a toothache we don't imply that we're taking part in a specific kind of behavioral conduct. The identity theory and not behaviorism, appears to have the brain body communication

issue right while it was logical behaviorism, not the identity theorists that comprehended the relations of mental states. Functionalism was able to distinguish this through software and hardware distinction. Functionalism is the way of thinking of brain that characterizes kinds of mental states as far as their causal jobs.

The psychological states are characterized as far as their causal relations with environmental or external consequences for the body, different sorts of mental states and body behaviour. The second recognizes it from logical behaviorism and it is neither a reductionist nor an eliminativist position. Functionalism consolidates the positives of logical behaviorism and the identity theory. It states the possibility that mental causation is a sort of physical causation. Subsequently, similar to the identity theory, it takes into consideration a realist answer for the issue of mind-body interaction and cooperation. Similar to logical behaviorism, it comprehends mental properties in a relational way.

Examining the Modules

The theory of modularity of mind has been associated with the computational theory of mind because of the fact that the computational view of mind entails the modularity view. The modularity thesis holds that the mind, which performs computations on the mental representations, has multiple modules to carry out its functions. The modules are the input systems which carry on domain-specific computational activities, which are mandatory, fast and are with shallow outputs; they are also informationally encapsulated (Fodor, 1975) [2]. The modularity thesis is no less an empirical theory than the computational theory of mind because both are hypotheses regarding the nature of mind and can be challenged on empirical grounds. The evidences in favor of the modularity thesis have been derived from the way the cognitive scientists have carried on their research on the cognitive activities of the mind, such as perception and language processing, among other activities of these kinds (Hacker, 2003) [1]. The modularity thesis has emerged as a theory to account for the way the mind functions in multiple modules without infringing on the autonomy of each of the modules. Each module is independent of the others in terms of its computations and representations. For example, the perceptual module functions in isolation from the language processing module because both have their unique domains. Fodor's Criteria of Modularity has a list of criteria for the modules that function as input systems. These criteria make it easy to identify the modules from the non-modular systems of the mind. For Fodor, the modules are the peripheral input systems that process information in the mind, which pass on the information to the central systems, which are themselves non-modular.

The characteristics for modularity of mind laid down by Fodor can be discussed as follows:

- Domain specificity: Each module is assigned a specific task within a specific domain. That is, each module is assigned a specific area of operation for the information processing. For example, the perceptual system and the linguistic system both function within their restricted domains and process the respective information.
- Mandatoriness: Each module performs its functions automatically without inputs from the higher systems of cognitive activity. Each module is so designed that it starts functioning as soon as the inputs are received from the world. For example, the visual system starts functioning as soon as an object is confronted by our sense organs.
- Inaccessibility: Modules function without being accessible to the higher systems. Each module is so self-sufficient that nothing is borrowed from the higher systems of representations.
- Fast Processing: Speed is a mark of modularity that requires least in the way of explication. In general, a cognitive process counts as fast if and when it takes place in a half second or less.
- Informational encapsulation: Modules are so self-closed that each has its own information encapsulated within it. That is, when a module functions, each processes its own information without borrowing anything from the neighboring modules. In short, information is encapsulated within each module for the sake of its speed as well as efficient functioning.
- Shallow Outputs: The input systems, because of their informational encapsulation, produce shallow outputs because what they produce do not go beyond what they are designed to produce. Visual information regarding an object, for example, does not produce perceptual beliefs about the objects. Belief fixation is a higher order cognitive activity, which is not produced by the visual module.
- Fixed neural architecture: Each input system is connected with a particular neural location in which is it realized. That is, each module is located in a specific part of the neural architecture. For example, the perceptual module has a different neural hardwiring than the linguistic module.
- Possibility of Breakdowns: Each module being associated with a fixed part of the brain, it is possible that the neural location gets impaired because of the internal causes.

For example, the perceptual module can be impaired beyond repair just as the linguistic module.

- Ontogenetic determination: Input systems as modules are ontogenetically developed, and so, show the signs of innate characteristic pace and sequencing. That is, each module has a pattern of inner development with a characteristic pace and pattern – notion on 'innateness'.

According to the above criteria, the central systems are not modular because they do not fulfil these criteria. The systems of belief fixation and problem-solving do not have informal encapsulation and other features such as domain specificity and so on. The central processing unit of belief fixation is domain-general, and so, not confined to any one particular domain. The mechanisms that operate in the central systems are free from the constraints of the input systems or modules as they work out the central belief formations and non-demonstrative inferences. For example, when we communicate through language by speech production, the central systems take the help of the perceptual and other modules that facilitate our representation of the world through language.

Delving into Fodorian Claims

Fodor is considered to be a *Modest Modularist* as he gave an account of the cognitive mind. This is in contrast to massive

modularity which states that the entire brain is modular. Also, interactionism (which stresses on perceptual and cognitive processes) is another theory of mental architecture against which theory of modularity is bases. Both behaviorism and cognitivism are interactionist theories.

Why is there a need to delve into modularity of mind?

- Models of mental architecture are supported by empirical observations;
- Vertical faculties can be studied individually;
- It is both dumb/fast–(perceptual processes) and slow/thinking (cognitive faculties);
- It provides a fixed structure to the human mind; hence, 'not anything goes'.

Let us look at few arguments that Fodor gives in support of modest modularity:-

- Modularity versus interactionist: Modularity would require considering mind as a module. It contains information processing via input whereas interactionist involves relationship between perception and cognition. For mind module to be understood let us look at the below diagram:

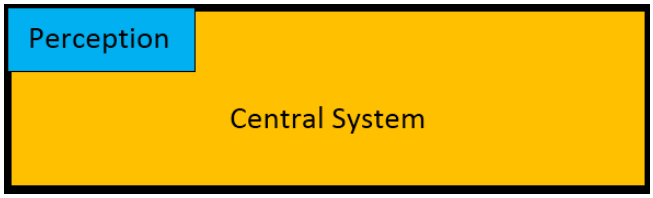

Fig 1

Our belief system has no influence on perception such as early vision. Therefore, reflex actions are dumb and encapsulated. Perception on the other hand is a window between reflex and cognition. It is a slow process and inferential whereas cognition is non-encapsulated.

- Modular theory argues for distinction between perception and cognition whereas interactionists argue for continuity between the two. Another theory is of massive modularity which states that there are massive modules of the brain. Fodor is against that as well and further believes that relying on interactionist theory also leads to relativism which means different people forming various perceptions.
- Fodor opines that reflex is a mechanical process whereas perception and cognition are computational processes.
- Reflex being non-inferential and encapsulated
- Perception being inferential and encapsulated
- Cognition being inferential and non-encapsulated
- Fodor refutes arguments claimed by the *Wicked Behaviorist* and the *Handsome Cognitivists:* The Wicked Behaviorist suggests that there is only stimulus and no perception or cognition. The Handsome Cognitivist on the other hand suggests that everything is guided by our belief and cognition. Hence, cognition is continuous perception. Fodor accepts a mid-view of modularity instead.
- It is a natural fact that only human beings use language for communication. These human languages are called natural languages. But all organisms, including non-human animals and non-linguistic infants, have mental representations and mental computations. It is because of the latter that the non-human animals and infants can cope with their environment. It is evident that the natural languages are not present in the non-linguistic creatures. Even then, they carry out their mental functions because there is a Language of Thought innately built into their minds. This theory of the Language of Thought widens the scope of the mental representations and computations beyond human species. Therefore, it is worth noting that the Language of Thought is very different from the natural languages, which only the human beings have. This is a representational and computational system, and therefore, is innate to organisms.
- Fodor also poses argument against the POSA or 'Poverty of stimulus argument' in which he states that for example, if a child and an adult are to acquire German language, both the child and the adult will have different responses. Hence, stimulus and response differs. Fodor claims that between stimulus and response there can be perception and cognition, former being inferential and encapsulated and the latter being inferential non-encapsulated.
- To further prove that humans are gifted with the language of thought, Fodor explains that for a concept like 'table' we are asked to form a definition of the concept. Besides, we are asked to know the extension of the concept of a table, so that we know under what conditions, a table falls within that extension. So, we have to learn the generalization: 'x is a table if x has y characteristics'. Thus, concept learning requires the mastery of generalizations and rules for truth. But this mastery would not have been possible if we were not endowed with thought processing. If we have an innate Language of Thought, then the learning of the concepts or their extensions is properly facilitated.
- In the architecture of the mind, only some information is accessible; hence modest modularity. Mind is like a computer, it can access information only within the mind.
- For modularity of mind, there needs to be 9 characteristics as listed above along with perceptual processes as informationally encapsulated. Perceptual processes are modularized and smart; there is principle difference between perception and cognition.
- As a theory of the mind and its computational structure, the language of thought hypothesis provides a new vocabulary for the underlying mental representations or thoughts. Hence, the system of mental representations is appropriately called the 'Language of Thought' as per Fodor. The Modularity thesis provides an account of the inner organization of the mind in terms of input systems or modules. Both the theses are empirical hypotheses based on experimental findings subject to empirical validation.

Concluding Remarks

It is preferred not to guarantee, that there is no embodiment in Fodorian claims. It is conceivable that a few subsystems are impenetrable to outside data sources. I would rather say that there are ample cross-connections between mental frameworks. It is terribly deceptive to state that the mind is modular. Best case scenario would be that the mind has secluded parts. The mind can be depicted as a system of interconnected frameworks and subsystems. A portion of the segments might be committed to a solitary mental limit;

however others may serve a wide range of limits. It is conceivable that no segment in the brain shows the dominance of properties as per Fodor's list of 9 characteristics. The term ‘modularity’ ought to be dropped on the grounds that it infers: numerous mental frameworks are measured in Fodor's sense and that theory needs support. Cognitive Scientists should keep on participating in useful decomposition of theories, however one should oppose the impulse to hypothesize and multiply modules.

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