Language and Pragmatics in the Multi-Layered Architecture of Mind

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Abstract

According to modularity hypothesis, mind consists of a variety of specialized systems, each with its own methods of representation and computation. These systems are of two main types: the input-output modular systems and isotropic non-modular central systems. This present paper briefly reviews all trends and approaches which account for the nature and place of pragmatics in the mind. Relying on previous theories, this paper proposes a model which is called a multi-layered architecture of mind. The new model embraces pragmatics as neither modular nor a unit in the mind-reading module. Moreover, it is neither the outcome of the process of modularization nor innately modular. This paper assumed that pragmatics is a set of principles in the higher cognition chip which is utilized to deal with differing sorts of problems. Therefore, pragmatics is conceived of as non-modular general- purpose set of principles.

1. Introduction

1.1. A Preamble

In cognitive science, there are two influential theoretical positions. On the one hand, there is the approach that the mind is a general-purpose problem solver (Piaget 1971; Newell and Simon 1972)1. On the other hand, there is the approach that the mind consists of special-purpose modules (Chomsky 1980; Fodor 1983; Gardner 1985). This second conceptualization is well known as modularity theory. The concept of modular organization dates back to Kant and to faculty theory. According to faculty psychology, for example, the mind consists of separate powers or faculties. The most popular form of this theory holds that mind consists of three separate faculties: the will, the emotions, and the intellect. But it is the publication of Fodor's The Modularity of Mind (1983), which sets the stage for recent theorizing in modularity, and which provides a precise set of criteria about what constitutes a module. Roughly speaking, modularity is the notion that complex systems are compartmentalized into a smaller set of special-purpose, autonomous modules. The aim of the present paper is three-fold. First, it reviews all trends and approaches which account for the nature and place of language and pragmatics in the study of mind. Second, it proposes a model of mind which is hierarchical and consists of different layers. The proposed model is called, "the Multi-layered Architecture of Mind, (MLAM, henceforth)." Third, the paper proposes a new conceptualization of language and pragmatics within the organization of mind. Pragmatics in MLAM is seen as a set of principles in the higher cognition chip which is devoted to deal with different sorts of problems.

1.2. Modularity and Linguistics

The idea of modularity has been a driving force in (both theoretical and descriptive) linguistics particularly in Chomsky's work in Transformational Generative Grammar (e.g. Government and Binding Theory the Minimalist Theory) and in neurolinguistics,

psycholinguistics, and developmental linguistics. The general point of view within these domains is that there is an innate language faculty responsible for all language processes and it is distinct from the central cognition which is assumed to be responsible for general cognitive processing such as memory, attention, consciousness, thinking, problem-solving, decision-making …etc. The language module in turn is assumed to consist of submodules; each of which is responsible for a particular linguistic task such as syntactic processing, phonological processing, lexical processing, etc. Each of these submodules has its specific input, well-defined task, and has no access to other modules within the language module. The syntactic processor of the syntactical module, for instance, is assumed to have no access to the phonetic and phonological processes or representations. It is also hypothesized that there are no input loops between modules. Thus, syntax cannot affect morphology because it receives its input from morphology.

1.3. Modularity and Pragmatics

Pragmatics has been dealt with within two main camps. In the first camp, which is usually called the interactive camp, pragmatics is not viewed as a single domain. It is viewed as the cause of linguistic structure, the set of communicative pressures under which all other linguistic levels have evolved. The second camp which is called the modular camp, pragmatics is approached in three different ways. First, pragmatics is seen as a single linguistic module, fed by the output of lower level phonetic, lexical and grammatical systems. It is, therefore, responsible for making subtle inferences about the meaning of outputs in a given social context. Second, pragmatics is observed as a collection of separate modules including sub-modules for the recognition of emotion, processing metaphor, irony, discourse coherence, and theory of mind. Third, pragmatics is brushed outside the language module. In this sense, pragmatics is handled by a General Message Processor or Executive Function which also deals with non-linguistic facts. 2

2. Review of Literature

2.1. The Thesis of Classical Modularity

2.1.1. Chomsky

Chomsky (1980:54-9, 224-5) first raised the issue of modularity, which has become a central topic in cognitive psychology and cognitive science 3. According to him, the mental state of "knowing a language" or competence consists of the following components: grammatical competence, conceptual capacity and pragmatic competence. In other words, Chomskyan modularity consists of the perceptual system, the principles of grammar and great number of other competences like music, mathematics, morality, scientific hypothesis, etc. Moreover, each Chomskyan module is a store of innate information or a system of mental representations (bodies of mentally represented knowledge) rather than a computational mechanism in a Fodorean sense (cf. Carston 1997:30-38) 4.

Chomsky believes that there is a specific mental module specialized for language. He states that "we may usefully think of language faculty, the number faculty, and others as "mental organs", analogous to the heart or the visual system or the system of motor coordination and planning" (Chomsky, 1980:39). However, he does not believe that language in humans has emerged under some specific evolutionary pressure. There is no doubt that on the conceptual side, the leading notion motivating Fodor's modularity of mind theory is the

Chomskyan notion of a module. In the next section, Fodor's theory of mind organization is explained in detail. Table (1) below summarizes Chomsky's components of language module.

Table (1): Chomskyan Language Module

Main Modules	**Sub-Modules**	**Sub-Sub-Modules**
Lexicon		
Computational System	Grammar	Morpho-syntax
		Semantics
		Phonology
	Processor/ Parser	
Pragmatic System		

2.1.2. Fodor

Drawing upon Chomsky's arguments postulating an innate organ for language acquisition, Fodor (1983) points out that the human mind consists of a variety of specialized systems, each with its own method of representation and computation. He suggests that there is a built-in dichotomy between what is computed blindly and what the human beings believe. On the one hand, there are input-output systems that are modular, distinct, vertical, specialized and structurally idiosyncratic. Modular systems include the input system modules (mainly the perceptual systems, like vision, audition, taste, smell and touch and language-understanding systems) and certain components of the output systems (including various processes involved in controlling different motor activities and language production). On the other hand there are central systems, which integrate information from the various input systems and from memory, and perform inferential tasks. It is in the central processing system that computations relevant to the human belief system are processed, by deriving top-down hypotheses about the world by integrating the outputs of modules and the stored information in the long term memory. In his view, abduction or inference to the best explanation requires to postulate a radically a-modular central processing arena. Therefore, these systems (belief-formation, reasoning, and decision-making) are non-modular isotropic and horizontal. Information from the external environment passes first through a system of sensory transducers, which transform the data into formats that each special-purpose module can process. Each module, in turn, outputs data in a common format suitable for central, domain-general processing. (Karmiloff-Smith 1994:695).The operations in this theory are summarized in the following figure:

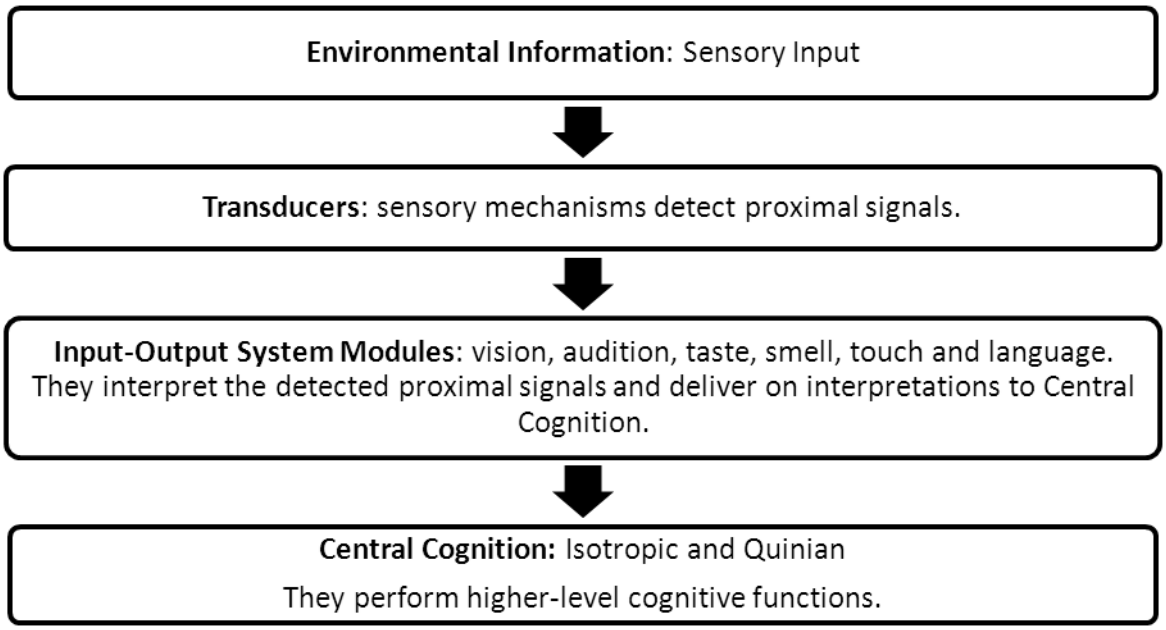

Figure (1): The main components of Fodorean modularity.

According to Fodor (1983: 47-101), modules possess the following features:
(1) Localized: modules are realized in dedicated neural architecture, i.e. input systems are associated with fixed neural architecture.
(2) Subject to characteristic breakdowns: modules can be selectively impaired. They exhibit characteristic and specific breakdown patterns.
(3) Mandatory: modules operate in an automatic way.
(4) Fast: modules generate outputs quickly
(5) Shallow: modules have relatively simple and shallow outputs (e.g., not judgments)
(6) Ontogenetically determined: modules develop in a characteristic pace and sequence.
(7) Domain specific: modules cope with a restricted class of inputs.
(8)Informationally encapsulated: modules cannot be guided by information at higher levels of processing (i.e., cognitive impenetrability and informational opacity).
(9)Inaccessibility: higher levels of processing have limited access to the mental representations within a module 5.

For Fodor, it is the co-occurrence of all the properties discussed above that defines a module. Particular properties, alone, do not necessarily entail modularity. Many cognitive scientists and philosophers now agree that mind is modular in nature, in some sense and to some degree. However, there is much disagreement about the exact meaning of modularity, and about the extent of the mind's modularity 6.

2.2. The Thesis of Massive Modularity

Evolutionary psychologists claim that the mind is massively modular (Cosmides and Tooby, 1994; Sperber, 1994; Pinker, 1997; Samuels, 1998). That is, the (human) mind consists of a very large array of informationally-encapsulated problem solvers. Like a Swiss Army Knife, the mind is an assembly of specialized tools, each of which has been designed for some particular purposes. The objection to this hypothesis is that a mind constructed along such lines is only capable of solving a matching array of domain-specific problems. A

massively modular mind is ill-prepared for novel problems or abstract and general problems. The great majority of experiences the mind everyday encounters are new. Fodor argues that a truly general intelligence has open access to all the information that is present to the human mind. Insofar as the human mind is an approximation to a general intelligence, it cannot be modular through and through (Fodor, 1983; Tooby and Cosmides 1995,xiii).

3. The Place of Waste Basket in the Cognitive Box

3.1. Fodor (1983)

The architectural model of mind put forward by Fodor (1983) would pack the pragmatic aspects of language use under the central cognition or the General Problem Solver GPS. They are extracted from the consideration of modularity altogether. Therefore, pragmatics and mind reading are central cognitive systems, which are used to attribute mental states to others on the basis of general-purpose reasoning abilities (Fodor, 1983). Within this framework, pragmatics could be seen as either modular (e.g. as a part of a Chomskyan language faculty) or inferential (e.g. as a part of a Gricean ability for inferential intention-recognition), but could not be both. Fodor himself combined a broadly Chomskyan view of language with a broadly Gricean view of pragmatics. On this approach, language is an autonomous, domain-specific modular system and pragmatics is a domain-general central system. The crucial difference does not only lie in the fact that pragmatics is inferential and language is not, but also in the fact that pragmatic inferences are heavily context-dependent, and there are no constraints on the type of contextual information that may be required or the source from which it may come (the interpretation of prior discourse, observation of the physical environment, encyclopedic memory, knowledge of the speaker, cultural, scientific or religious assumptions, exercise of the imagination, and so on). For Fodor, pragmatic interpretation is a central process because its outcome depends on ‘global’ factors such as free access to memorised information.

3.2. Grice (1967, 1969, and 2001)

Grice analyzes overt communication as a process involving the expression and recognition of intentions. He treats the comprehension process as starting from a meta-representation of an attributed utterance and ending with a representation of an attributed thought. Therefore, utterance interpretation is a variety of mind-reading or theory of mind. Accordingly, pragmatic interpretation is accomplished in metapsychology in which the hearer infers the speaker’s intended meaning from evidence he has provided for this purpose. The question of whether mind-reading is a modular or a central system in Fodor's sense can have direct implications for pragmatics. This view is different from Sperber and Wilson's view that pragmatic interpretation involves a dedicated comprehension module (a meta- communicative module) with its own special principles and mechanics. Verbal comprehension consists of decoding which recovers linguistic meaning and an inferential process which results in the attribution of a speaker's meaning (Sperber and Wilson 2002).

3.3. Sperber and Wilson (1986, 1993 and 2002)

Although fundamentally based on Fodor's modularity of mind, Sperber and Wilson’s (1986) approach to pragmatics is different from Fodor's account. Sperber and Wilson (1986:67-69) disagreed with the Fodorean cognitive account of pragmatics. Thus, the standard position within Relevance Theory is that the pragmatic processing is non-modular. Pragmatics, in their perspective, is defined as a domain in which grammar, logic and memory

can interact. They have proposed that the pragmatic processes of utterance interpretation are the task of central systems due to the tractable nature of these processes. These pragmatic processes are characterized by fastness, spontaneity and apparent mandatoriness. Besides, they are un-encapsulated and non-modular because they involve a kind of rational belief-fixation. In addition, pragmatic phenomena cannot be localized into a grammatical module and it lacks the modular structure of grammar. They stress that a full account of the ability of the speakers and hearers to carry on successful discourses involve "inferential comprehension". But since the ability to draw inferences reflects the working of a "central process" in Fodorean sense, discourse competence cannot be on a theoretical par with grammatical competence. Nevertheless, Wilson and Sperber (1993) have discovered the idea that certain characteristics of pragmatics might be taken as evidence that ostensive stimuli (or utterances) are processed by a dedicated mental inferencing system (or a module). Sperber and Wilson (1986) have dropped their assumption of a necessary connection between codes and modules. This means that pragmatics does not involve rule- systems (codes). They go further to state that the pragmatic account remains general and individual and accordingly all pragmatic processes, such as (generalized and particularized varieties of) conversational implicatures, reference assignment, disambiguation and various enrichments and loosenings of linguistically encoded concepts, are accounted for by the same communicative principle (cf. Carston 1997:45, 50).

Sperber and Wilson (2002) argue that pragmatic interpretation is not simply a matter of applying Fodorean central systems or general mind-reading abilities to a particular (communicative) domain. Verbal comprehension presents special challenges, and exhibits certain regularities, not found in other domains. It therefore lends itself to the development of a dedicated comprehension module with its own particular principles and mechanisms. They (ibid) show how such a meta-communicative module evolves as a specialisation of a more general mind-reading module, and what principles and mechanisms it contains.

Moreover, Sperber and Wilson (2002) argue that most pragmatists working today would agree with this description of pragmatics. Most would also agree that pragmatic interpretation is ultimately a non-demonstrative inference process which takes place at a risk: there is no guarantee that the meaning constructed, even by a hearer correctly following the best possible procedure, is the one the speaker intended to convey. However, this picture may be fleshed out in several different ways, with different implications for the relation of pragmatics to other cognitive systems. On the one hand, there are those who argue that most, if not all; aspects of the process of constructing a hypothesis about the speaker's meaning are closely related to linguistic decoding. These code-like aspects of interpretation might be carried out within an extension of the language module, by non-metapsychological processes whose output might then be inferentially evaluated and attributed as a speaker's meaning. On the other hand, there are those who see pragmatic interpretation as metapsychological through and through. On this approach, both hypothesis construction and hypothesis evaluation are seen as rational processes geared to the recognition of speakers' intentions, carried out by Fodorean central processes (Fodor, 1983), or by a 'theory of mind' module dedicated to the attribution of mental states on the basis of behaviour.

3.4. Sperber (2000)

The approach proposed by Sperber (2000) treats pragmatics as a crucial module in the general architecture, implying modularity all over the place. This is in line with the developments in the modularist group over the past two decades: To overcome the looseness

of systems of General Cognition put forward by Fodor (1983), the field moved towards interpreting higher order thought processes in a modular way especially in psychology. This is an application to the pragmatics of the approach that would deal with all of the human cognition in a modular way. This has been referred to as the thesis of Massive Modularity by Fodor (2000). In Sperber's perspective (2000), the key to understand the workings of old time General Problem Solvers or General Cognitive Mechanisms is to propose an entire meta – cognitive field that would be responsible for the Representation of Representations. He holds the concept that two dedicated mental mechanisms exist, one for language and the other for meta – representations (a meta-representation is a representation of a representation). In his modular approach to pragmatics (the pragmatic domain as a meta – domain), Sperber states that the core ability for pragmatics is a meta – representational ability. The following table outlines the sub – systems of meta – representational ability and their main functions:

Table (2): Meta – Representational Modules (summarized from Sperber 2000)

Modules	**Functions**
Meta – psychology Module	Theory of mind
Comprehension Module	Discovering communicative intentions
Logical Module	Checking Arguments.

In this view, reconstructing the intentional world of the other, the Theory of Mind module, is a key aspect of this deconstruction of the formerly unspecified General Knowledge. Sperber (2000) also states that the inferential procedures involved in communication might constitute an additional separate sub–system, as well as the logical processes involved in argumentation. Both are related to the intentionality–based metapsychological system, but this latter one by itself and in itself does not necessarily entail communication and logical coherence (cf. Pleh 2000: 423).

3.5. Kasher's Modularity (1991)

Relying on both Fodorean (1983) and Chomskyan (1980) modularities of human cognition; and relying on autism as his basic support, Kasher (1991) proposes the modularity of pragmatics. He argues that the impairment in autistic children lies in the area of pragmatics of language and not in communication. His theoretical framework is based on the view that pragmatics is astudy of language use which distinguishes between language and communication.He conceives of module as a cognitive system that is "independent" in several significant respects (Kasher, 1991:390-911). It is domain specific; it is informationally encapsulated; it is associated with a fixed neural architecture; it has specific breakdown patterns and its ontogeny has a characteristic pace and sequencing. For Kasher, pragmatics in mind consists in a pragmatic module, a pragmatic central system and a pragmatic interface. His model is summarized into the following points:

a. ***Core pragmatics****: knowledge of basic speech act types, e.g. assertion, question, command. This is a sub-module of the language module (linguistic pragmatics).*

b. ***Amplified core pragmatics****: knowledge of non-basic speech act types, e.g. acquitting, congratulating, admitting. This is part of the non-modular central systems.*

*c. **Talk-in-interaction pragmatics**: knowledge of conversational behavior, e.g. turn-taking, sequencing, repair. This is a distinct module.*
*d. **Central pragmatics**: knowledge which involves application of general cognitive principles and general knowledge, e.g. generation of conversational implicatures, indirectness, aspects of style, politeness. This is part of (non-modular) central systems.*
*e. **Interface pragmatics**: knowledge which involves integration of data from the language module and other sources (e.g. perceptual), e.g. assigning referents to indexical expressions. This is part of non-modular central systems (cf Kasher 1991; Carston 1996; Cummings).*

4. A New Model

In this section, a general perspective on mind, language and pragmatics is put foreword. In section 4.1., a multi-layered architecture of mind is proposed. Section 4.2. argues against the modularity of language and pragmatics. Section 4.3. suggests a view that underlies the cognitive basis of pragmatics.

4.1. A Multi-Layered Architecture of Mind

Before discussing the major components of the multi-layered architecture of mind and its internal operations, some points should be highlighted:

First, there are good reasons to believe that Language is one of the most complex cognitive processes and all parts of the mind must get involved in its production and interpretation. Therefore it is erroneous to assume that language can be a self-contained unit or module. By the same token language colonizes the brain, one would dare say that it colonizes the mind as well. It stands to reason that both Chomsky and Fodor created a bottleneck problem by restricting language to a module or a fixed formalization. Their account is an oversimplification of the intricacies of language both as a form and as a function. Language must be thought of as a dress of all our states, actions, experiences, and conceptualizations. Accordingly, it is suggested that language is omni-present and that it consists of only three parts: syntax, semantics and pragmatics. Syntax appears as a set of rules in Higher Cognition (HC, henceforth) chip. Likewise, pragmatics is a set of principles in the HC chip. Semantics appears as a set of lexical entries in the memory. This doesn't suggest syntactic rules and pragmatic principles can be used interchangeably. However, syntactic rules may be used to solve some pragmatic problems and pragmatic principles may also be used to overcome a syntactic problem.

Second, all cognitive systems except the sensory modules cannot be modular because they use information from multiple sources freely to produce different outputs depending on contextual information. Fodor (2000) is right to claim that central processes are abductive and that neither encapsulated modules nor computational systems of any kind are capable of performing abductive inferences. Pragmatic comprehension of speech acts, for instance, is a process which modularity cannot succeed to deal with. Analogy, metaphor, and counterfactual reasoning are similar to speech act. Therefore, modularity must be put up with. According to Fodor (1983, 2000), abductive inference can be seen as "inference to the best explanation." For example, when scientists decide what the best possible explanation for a set of observed phenomena is, they necessarily perform abductive inference. Abductive inference is, therefore, global, in the sense that any piece of information could, in principle, bear on the inference (cf. Pinker 2005).

Third, one may somehow agree with Fodor's (2000) view that the function of human information-processing devices is to fix true belief. The function of human information-

processing devices seems to fix true belief as much as fixing true belief creates fitness to environments. This fitness to environment has not permanently been idealistically fitting and practical. Human mind may not always be successful in achieving the best adaptive outcomes. Even the true beliefs could not always bring about the best adaptive outcomes. Therefore, one may agree with Pinker (2005) point of view that true belief does not necessarily always yield the best adaptive outcome and that human minds sometimes seem to be poor at generating true belief in a number of domains (cf. Kahneman, 2003).

Fourth, Fodorean features of modules such as, speed, impenetrability and pre-wiredness blur the picture of what a true module may look like, because they are actually bound up with such features of sensory modalities. Vision module, for instance, is susceptible to change in its speed with the age of the person. It may also be penetrable by the higher cognition.

Fifth, this study rejects evolutionary psychologist's claim that, "our cognitive architecture resembles a confederation of hundreds or thousands of functionally dedicated computers [often called modules] designed to solve adaptive problems endemic to our hunter-gather ancestors" (Tooby & Cosmides, 1995:xiv). Therefore, cheater detection module (Cosmides, 1989); theory of mind (Carey 1985; Leslie, 1994; Baron-Cohen, 1995; Scholl & Leslie, 1999); spatial orientation (Hermer & Spelke, 1996); number (Dehaene & Cohen, 1995); intuitive mechanics (Leslie, 1994; Spelke et al., 1992); fear, disgust, jealousy, and other emotion systems (Buss, 1992; Rozin et al., 2000); folk-biology (Atran 1990, 1999); a system for processing and kepping track of social contracts (Cosmides & Tooby, 1992); kin detection (Lieberman, Tooby, & Cosmides, 2003); and face recognition (Duchaine et al., 2004; Kanwisher, 2000) have no real advantage. These functions are natural consequences of human beings' attempt or use of abductive inferencing to reach ideal ends.

This section proposes a model which roughly tries to account for the organization of the human mind. The present cognitive model suggests a humble account of the complex structure of the human mind. Mind in this sense is multi-layered. Information of various types from environment gets into the sensory transducers which change them into special formats or symbols accessible to the upper cognitive input systems or quasi-modules. These quasi-modules constitute the first-level cognition in our model. The concept quasi-module is adopted from Smith and Tsimpli (1996). Quasi-modules are not informationally-encapsulated like Fodorean modules. They are function-specific systems and they have epistemic limits, and therefore, they are domain-specific. A domain is the set of representations sustaining a specific area of knowledge, such as vision, audition, etc. Moreover, they are specialized to perform only one function. However, they are not completely automatic. Some of them work under the direct control and second-by-second supervision of the higher cognition, such as audition and vision. Similar to Fodorean modules, quasi-modules in this model interpret the detected proximal signals and then deliver their interpreted perceptual judgments to upper mental levels. The difference between Fodorean modules and Smith and Tsimpli's (1996) quasi-modules are summarized in the following table:

Table (3): Modules vs. Quasi-Modules

	Domain-specificity	Information encapsulation
Modules	Yes	Yes
Quasi-modules	Yes	No

If necessary, then information may get into the emotive cognition. This cognitive level is crucially concerned with the recognizing, knowing, forming and interpreting emotional information or representations. By emotional information, I mean all types of feelings, moods and sensations, such as love, hatred, horror, lust, fear, pity, sorrow, joy, desire, eagerness, enthusiasm, vehemence, gusto, etc. knowledge and processing in this cognition are only partly innate. However, the lion share of its content is acquired after birth. This may justify the various quality and quantity of the content of this cognitive level. This level cannot be modular even though it is domain-specific. This cognitive level constitutes the first level of intentional psychology. This makes its development or its acquisition of some knowledge and skills under the direct control of the higher-cognition chip. The rationale behind this may be that HC chip is more globally rational and has wider innate predispositions to optimally achieve personal goals and interests, to optimally adapt to the environment and to optimally assimilate in one's society.

The rational cognition constitutes the second level of the intentional psychology. It is a general system capable of doing routine activities and retains different sub-systems of knowledge and skills of particular theoretical and practical specializations. Thus it contains all skills and knowledge we need to perform our everyday routine activities and jobs. A university professor or a carpenter uses the rational cognition in performing his or her work. However, any innovation or modification in these fields needs the intervention of the HC chip. The rational cognition has a conceptual memory which assists it in all its internal processing. If innovation or modification is done by the assistance of the higher chip, such changes are kept in the rational cognition's conceptual memory. Linguistically speaking, it is also responsible for interpreting semantic presuppositions, entailments, anaphora resolutions, conventional implicatures, modality, conventional metaphors, synonyms, hyponyms, etc. It has access to higher-level components such as, syntactic rules and the semantic memory in the higher chip. It will be responsible for processing all types of conventional meanings. This cognitive level can be an empty slate at birth. It is built up after birth, and its content is constantly modified by the HC chip.

The higher cognition chip is a storehouse of different guiding ethics, norms, rules, patterns, principles, schedules and constraints. They are utilized for achieving different social, psychological, institutional, cultural, and cognitive functions. Some rules or principles may be present at birth like those in awareness and others may be formulated after birth like principles of pragmatics. HC chip can be seen as a clearing house which integrates various interpretations and processes from lower cognitive levels with one another and with memory in accordance to its sets of ethics, rules, principles, etc. Therefore, it is able to accept, reject, and revise any interpretation or processing from the lower levels. Decision-making, problem-solving, belief-formation, reasoning (induction, deduction and abduction), conscious awareness, imagination, intelligence and creativity are the function of the higher cognition chip. It seems that the most important function of the HC chip is the abduction reasoning which seems to be important in enormous number of mental operations, including language acquisition. Intelligence and creativity can be natural outcomes of ideal applications of abductive reasoning. It might be that abduction is the only innate basic rule at birth. However, it is useful to think of a few basic components as innate processors. Perceptual processing abilities, basic rules, principles and ethics in HC chip are to a great extent innate. The chip acquires rules of grammar, for instance, by using its basic innate rules or abduction and this internalization is triggered by child's coming into contact with the social environment.

In Fodor's model (1983), a grammar is a code which relates phonetics to semantics. The language component in the MLAM, however, is neither syntagmatically nor paradigmatically modular. Grammar in MLAM is not a code which relates the phonetic representations of sentences to semantic representations. This formulation of grammar as a set of rules in the HC chip enables interactants to recover the intended semantic interpretations of utterances. Grammar may have very little access to the relevant contextual information. By the same token, the pragmatically motivated principles may also guarantee the total some of the pragmatic meaning. However, the contextual constraints and assumptions on these principles are enormous in number. The more constraints and assumptions are present during the interpretation of a particular utterance, the lesser the guarantee the hearer has to successfully recover the intended interpretation of that utterance. Therefore, pragmatic indeterminacy comes out as result of different constraints and assumptions. Along similar lines, Wilson and Sperber's (1986:89) claim that there is no algorithm for choosing the appropriate set of contextual constraints and assumptions that the hearer should utilize to decode the speaker's intention seems agreeable. The lack of algorithm for selecting the appropriate set of contextual constraints and assumptions may be the crucial reason behind indeterminacy of pragmatic meaning.

HC chip encompasses various sets of innate tendencies, schedules and instincts which need social, psychological, biological and environmental kickstarts (to use karmiloff-Smith's, 1992; 1994) terminology. However, MLAM does not tend to modularize these schedules and tendencies. These components in the HC chip are responsible for various time-bound biologically-based actions and activities, such as language acquisition, aging, circadian rhythm and so forth.

This section proposes that there is no a dedicated module for pragmatics per se. In stead, there is a processor or a chip whose task is to form, store, renew, and apply rules and principles. Pragmatic principles are conceived of as a part of the HC chip's principles, rules and constraints for all purposes and occasions. Conversational implicatures are a function of the HC chip. Implicatures need the appropriate pragmatic principles, language-user's online attention of communication and conscious awareness of the context of situation. Conventional implicatures, entailments, semantic presuppositions, and other semantic inferences can be processed in the rational cognition. Linguistically speaking, the HC chip is responsible for intonation contours, and patterns of discourse organization, however.

Memory in the HC chip plays an important role in the overall work of mind. Different person-specific entities, behaviors, procedures, patterns, schemes, scenarios, and models referring to external referents are all stored in the memory. During any mental operation, all necessary and relevant items are retrieved from the HC chip memory and other levels' memories and are combined to the new data in accordance to specific rules, principles and patterns. In a routine mental processing, such combinations take place in terms of connections strength.In non-routine (pragmatic) processing, combinations are chosen in terms of particular culture-specific pragmatic principles, say the Gricean CP maxims.

The flow of information depicted in the figure below runs as follows: one receives experience as raw sensory data. Such data from the various modalities get integrated. That is, it is quickly encoded in one or more of the sensory forms. These data then percolate upward and get encoded affectively and as various emotions about the data. Afterwards, data which are encoded variously are sent to the rational processor. The transmission of information between processors is not always linear. A particular piece of experience need not go to emotive processor or the rational cognition. This transmission and controlled processing

ultimately takes place under the supervision of the higher cognition chip which is responsible for achieving the maximum level of interest and benefit for the individual. Higher cognition chip is omniscient macro-processor and has absolute control over and optimal awareness of experience, encoding and processing.

When two auditory signals reach the ears, the mental processors at all levels under the guidance of the HC chip selectively attend to the most important one and let the rational cognition attend to the less important one. The chip can shift its attention to the other signal and the rational cognition automatically responses to this shift of attention. Similarly when one looks at an erotic picture, one may use the emotive cognition by which he will stimulate his senses or he may possibly use the higher chip to process it. In the latter case, he will have ordinary interpretation with no arousal of emotions.

In an interim summary, a five-layered architecture of mind is proposed with sensory states, modular states, emotion states, belief states and higher cognitive processor. This model introduces two levels between quasi-modules and full blown concepts. These levels are extremely important in processing ordinary routine information. They may be responsible for the accuracy and rapidity of overall mental processing.

following table summarizes the components, affiliations and main functions of the MLAM.

Table (4): The Components, Affiliations and Functions of MLAM

Components of MLAM	**Psychological Realms**	**Functions**
Quasi-modules	Computational Psychology	Dedicated domain-specific mechanisms. They are not informationally encapsulated.
Emotive Cognition (knowing)	Intentional Psychology	**Sensational:** pain, nausea, tiredness, orgasm, hangover, itches, numbness, etc. **Feelings**: anger, jealousy, fear, love, hatred, sorrow, admiration, envy, disgust, happiness, sadness, irritation, amusements, panic, lust, vanity, modesty, etc. **Perceptual Memory**
Rational Cognition (knowing)	Intentional Psychology	Knowledge of different fields and disciplines, skills, recognition, already-existent beliefs, values, attitudes, norms, thoughts, proofs, explanations, ideologies, purposes, etc. **Conceptual Rational Memory**
HC Chip (thinking)	Intentional Psychology	Intelligences of all kinds, learning, controlling all activities in the whole mind, creativity (creating, inventing and exploring), imagination (imaging, day-dreaming, pretending), intentions, will, kenaesthesia, proprioception, making decisions, forming and demolishing beliefs, solving and creating problems, making judgments and ideologies, attention, etc. **HC chip Memory** for storing all contents of the HC chip.

4.2. The Place of Language in the Organization of Mind

This section proposes the following two points. First, language does not constitute a module.Second, language activities (language production and comprehension) are performed by the same processors at various cognitive levels. It is more plausible to propose that linguistic processes which take place at various levels and belong to different language components must be processed at different places in the mind. Each place or processor is responsible for a specific micro-analysis. The HC chip then integrates the results of these

processes and takes the most optimal decision. The HC chip has conscious awareness of all the signals entering the quasi-modules. It attends to their decoding and their affective meanings with the assistance of the emotive cognition. The chip also attends to their interpretations in the rational cognition if the signals have only routine interpretations. Otherwise, signals are submitted to the chip for more profound analysis. Such description suggests that the processes in MLAM in general and linguistic analysis in particular are linear. But this is not true. If the discourse has emotive dimensions, the signals enter the emotive cognition; or else they are forwarded to the rational cognition. Such decisions are unconsciously taken by the higher chip. The rational cognition contains, for example, basic reasoning logics, frames of relations and associations, intonation contours, patterns of discourse organization. It has access to higher-level components such as, syntactic rules and the semantic memory in the higher chip. The rational cognition does most of the interpretation processes when the data received requires conventional treatments. Rational cognition is responsible for interpreting semantic presuppositions, entailments, anaphora resolutions, conventional implicatures, modality, conventional metaphors, synonyms, hyponyms, etc. However, if the signals have non-conventional meanings, a decision taken by the HC chip, they are forwarded to the chip itself. The chip has more sophisticated strategies and tools of analysis, more attentiveness to the context and faster access to the memory. The memory in the chip is a large pool or database of intra-HC chip and inter-MLAM information. Semantic memory is a part of chip memory. Anyhow, semantic memory is not independent or self-contained unit within the chip memory. Therefore, data may appear as constraints on the application of a particular rule or principle in the HC chip. The semantic memory, which is only theoretically real, contains all lexical entries with their morphological and phonological features. The semantic memory may contain lexical entries from different languages if the individual were a polyglot. The point of departure of the proposed model from other theories of multilingualism is: while other theories claim that a polyglot has two or more sets of syntactic rules, the present paper asserts that monolingual, bilingual and multilingual individuals have only one set of syntactic rules with different constraints for each language. The actual reasons for this are twofold. First, a multilingual individual can be as fast in both first and second language speech as a monolingual one is in his first language speech. Second, the higher chip is a clearing house and is able to perform multiple (and most often simultaneous) functions. This necessitates the existence of lesser number of rules and constraints. The HC chip is responsible for processing all pragmatic phenomena, such as conversational implicatures, metaphors, ironies and different other speech acts.

Mental operations can not rely on symbols for inner communication for many reasons.One important reason is the implausibility of the processors to cope with the speediness, accuracy and amount of data processed every second. So the native languages are the legitimate tools which may serve as the medium of interaction, integration, conscious thinking, and reflexive consciousness. Cognitive processes may also be mediated hand-in-hand by visual images. However, there is more reliance on the first language in thinking particularly because the overwhelming majority of processing hinge upon abductive reasoning which in turn relies more on language than images. In addition to language and visual images, other sensory modalities can play significant roles in thinking and knowing processes. They may have roles in pre-quasi-module, inter-quasi-module, and post-quasi-module processes. There is compelling evidence that inter-module interaction is possible. An example of such interaction is Syneasthesia. Consider the processing of experiencing something with one sense that is spontaneously associated with a different sense. Such experiences may take place

relying on different sensory modes such as colors, smells, tastes, etc. If the question, 'How does our minds process such multi-model experiences?' is adequately answered, we will perhaps have a better insight into what is the language of thought? 7

4.3. Pragmatics can not be a Module

The goal in this section is to cast some doubt on the modularity of pragmatics. This goal will be achieved by relying on Fodor's criteria for modularity overviewed in section 2.1.2. Besides, this section demonstrates that Fodor's criteria are not jointly satisfied by subsystems within the mind, and some of them are highly problematic and not satisfying. Before proceeding, pragmatics should be proved to be a part of the central system. Consider the following strands of argument:

1. Informational Encapsulation

According to Fodor (1983: 67) a cognitive process is informationally encapsulated if it has access to only the information represented within the local structures that subserve it. This definition does not apply to pragmatics for a very simple reason; pragmatic processes make access to all and any type of information necessary to reach a plausible end. These resources include long term memory, contextual information and so on.

2. Mandatoriness

If pragmatics is modular, it would perform its functions automatically when it is given the clue that normally triggers it. As a matter of fact, we have the ability to prevent, stop, modify, etc a pragmatic computation. Pragmatics is voluntary and optional. A pragmatic computation is affected by many factors and priorities. This does not intersect, in researcher's view, with the fact that it is a deadly fault to ' put off ' pragmatics at the wrong moment. Most often, the pragmatic computation goes off-key.

3. Domain-Specificity

Pragmatics cannot be domain-specific because it gets information from all over the place. Theoretically speaking, anything can be relevant to anything else if given suitable circumstances in a particular pragmatic process. For this reason, pragmatic processes cannot be other than domain-general. This feature hinders their speed as well.

4. Localization

Different pragmatic aspects are neurally localized in different brain areas. It has been proved that various pragmatic aspects are subject to characteristic breakdown. Anyhow, neural localization does not by itself constitute a solid piece of evidence for the modularity of pragmatics because even some nonmodular processes can be neurally localized and be subject to characteristic breakdown.

5. Shallow Outputs

Pragmatic processes yield deep and finished outputs and most of the time affect or get affected by the phonological and grammatical forms. This criterion alone might be taken as a compelling reason to reject the modularity of pragmatics.

6. Speed

Because pragmatic processes have to be rational and infallible, and because they are not automatic, their speed is relative. Their speed is affected by the seriousness of the situation, their sensitivity to evidence, contextual information, and background and world knowledge.

7. Accessibility

Unlike sensory modules, pragmatics seems to be accessible because when people process pragmatic information, there seems available to them explicit report of the information that pragmatic representations encode. As a matter of fact, such reports are fully

and freely available to the higher cognitive processes that eventuate in the voluntary determination of the overt behavior.

8. Fixed Neural Architecture

According to Fodor (1983:98), the perceptual systems and language are hardwired and have fixed neurological architecture. The hardwiring of a particular system indicates privileged paths of informational access. It facilitates the flow of information from one neural structure to another. Fodor (ibid. 99) concludes that ' neural architecture …. is the natural concomitant of informational encapsulation.' Neurolinguistics has shown that some brain lesions have certain pragmatic consequences. Irrespective of this epiphenomenon, there is no specific region which regularly responsible for pragmatic dysfunctions. Let it be as it may, the sole feature of hardwiring doesn't necessitate the a-modularity of pragmatics. Pragmatics is, therefore, non-modular.

9. Characteristic and Specific Breakdown Patterns

According to Fodor (1983:99), any psychological mechanism which is functionally distinct may be selectively impaired. There are pathological syndromes relevant to the perceptual and language-processing systems. Such selective impairment takes place even in memory and attention which are part of the central cognition. Fodor admits that this feature is both shared by the modular and central systems. Therefore, this is not a reliable criterion for the modularity of an intricate cognitive function such as pragmatics.

Considering the strands of arguments against the modularity of pragmatics put forward by the researcher so far, it seems that none of the current modular views of pragmatics are really practical, objective and plausible. Consequently, the present paper proposes a new view of pragmatics relying on researches reviewed in section three.

4.4. The Nature and Place of Pragmatics in Mind Organization

Pragmatics in MLAM may have the following features:

1.Certain pragmatic aspects are not uniform within the same culture. They are liable to different changes and their interpretations rely on different contextual variables and effects.

2. Pragmatic interpretations depend on various types of information coming from different sources including the perceptual modules. In other words, there are no constraints on what information can be used in a pragmatic processing.

3. Pragmatic interpretations can have individual-specific traits. Pragmatic interpretations may depend on the mood and the shared knowledge of discourse participants when only two are symbolically involved in a stretch of talk. Hence interpretation changes with these factors and sometimes without any reference to the normal canonical pragmatic principles and constraints. More specifically, a pragmatic interpretation may not be uniform across individuals and thus becomes socially and even linguistically haphazard.

4.Pragmatics is not uniform in content, basic constraints and principles. The current theoretical accounts of pragmatics do not capture all pragmatic processes, constraints and principles. Presupposition is a case in point. There are no clear demarcation lines between its pragmatic and semantic aspects.

5.Pragmatic principles and constraints can be recruited by other cognitive components for sophisticated tasks and meta-cognitive processes.

6.Pragmatics, sensu lato, consists of different divisible capacities and competences. It could be that these capacities and competences are heterogeneous and are learned by induction through environmental interaction. Therefore, they cannot be subsumed under one or more coherent system.

7.There are no constraints on the information apparently available to pragmatics but unavailable to the rest of the cognitive system [8].

Relying upon the already-mentioned features, pragmatics can be categorized into the following types: socio-pragmatics, pragmalinguistics, cognitive pragmatics, institutional pragmatics, and organizational pragmatics. However, this theoretical distinction does not presuppose the existence of any solid boundaries. This distinction may only find its roots in our perception and intuition and therefore can not have a psychological reality. The principles involved in these types of pragmatics together constitute the system of pragmatic principles, which are responsible for pragmatic thinking, reasoning, imagining, planning, production and comprehension. This view sees pragmatics as a pool in which we organize our set of internal representations of rules, principles and constraints of language use. A pragmatic set of principles, in researcher's perspective, tries to regulate all types of pragmatic operations. This pragmatic set of principles, however, is not completely innate. It is to a great extent formulated after birth and its principles are mutable as far as the socio-cultural and cognitive aspects of our world are mutable. In this sense, the set of pragmatic principles is not a module, but it is a part of a chip responsible for creating different types of rules and principles we manipulate in this world to guide our verbal and non-verbal behaviors. The set of the pragmatic principles is responsible for the following pragmatic processes and operations:

1.Accounting for intentions, meta-pragmatic awareness, pragmatic inferences, abductive inferences and various pragmatically-based norms, values and attitudes.

2.Accounting for socio-cultural contexts, meanings, norms, values, attitudes, beliefs, institutional knowledge and knowledge of various socio- cultural conventions.

3. Modifying the structures of inferences, and intentions.

4.Accounting for the principles or conventions which regulate sequences of questions, answers, assessments, and changes of topics.

5. Accounting for the organizational principles, relations, hierarchies and coherences.

5. Conclusions

Many approaches to pragmatics fall either into the 'modular' camp, according to which pragmatics is seen as a self-contained component on a par with syntax or lexis or even (the product of) a discrete mental module (Sperber & Wilson, 2002); or the 'perspective' camp, according to which pragmatics is seen as different in kind from theoretical and/or cognitive entities like syntax and lexis, exists at a higher level of abstraction than linguistic phenomena and effectively constitutes a metacognitive stance (e.g. Verschueren, 1999). This paper attempts to demonstrate the state of a general theory of pragmatics as neither belonging to the first camp nor to the second. It argues against the modular account of pragmatics. It is proposed that there is no specific module for pragmatics. Instead, there is a chip in higher-level cognition specialized for forming, storing, applying all types of rules, principles, and constraints. Some of these principles are used for various pragmatic purposes and they are fitting different pragmatic contexts. The language with which cognitive systems can communicate together can be via visual imagery particularly at birth but soon thereafter this will be accompanied by our acquired language. There is good reason to believe that we may also use other modalities at various levels of cognitive processing.

Notes

1. Jean Piaget (1971) conceived of language both as a social and a cognitive phenomenon. Therefore language was not an independent modular faculty but it was a part of the general cognitive and perceptual processing.

2. For more on this vast topic, see e.g. Cummings (2005); Carruthers (1992, 1996, and 1998).

3. Faculty psychologists in the nineteenth century also divided the mind into autonomous areas.
4. Evolutionary psychologists like Cosmides and Tooby (1992, 1995) favor Chomsky's sense of a module. However Cosmides & Tooby claim that the mind is the product of natural selection, i.e., an adaptation. Natural selection would have favored Darwinian modules (e.g. mate choice, naïve physics, cheater detection, shelter finding, predation avoiding, etc).

5. For a detailed description of these criteria, see Fodor (1983).
6. For a full discussion of these issues, see Caruthers (2003).

7. Steven Pinker (1994) highlights several reasons to suppose that thinking must be done in a special language or mentalese and not in our native languages. These reasons include: 1) accounting for the fact that we often remember the `gist' of a sentence rather than the sentence itself; 2) the fact that new words are coined to express new thoughts; and 3) the fact that many sentences of natural language can be ambiguous or logically inexplicit while, presumably, the thoughts they represent are not. 4) People who are born deaf and cannot speak can obviously think. 5) Einstein claimed to think in the manipulation of visual imagery.
8. This is also called informational opacity. According to this aspect of encapsulation, there may be constraints on the information apparently available to the module but unavailable to the rest of the cognitive system (Fodor 1983).

References

(1). Atran, S. (1990). *Cognitive Foundations of Natural History: Towards an Anthropology of Science.* Cambridge: Cambridge University Press.
(2). _____ (1999). Folk Biology and the Anthropology of Science: Cognitive Universals and Cultural Particulars. *Behavioral and Brain Sciences*, 21.
(3). Barkow, J., Cosmides, L. & Tooby, J., (eds.) (1992). *The Adapted Mind.* Cambridge, MA: MIT Press.
(4). Baron-Cohen, S. (1995). *Mindblindness.* Cambridge, MA: MIT Press.
(5). Buss, D. M. (1992). Mate Preference Mechanisms: Consequences for Partner Choice and Intrasexual Competition. In J. H. Barkow, L. Cosmides, & J. Tooby (Eds.). *The Adapted Mind: Evolutionary Psychology and the Generation of Culture* (pp. 249–266). Oxford: Oxford University Press.
(6). Carey, S. (1985). *Conceptual Change in Childhood.* Cambridge, MA: MIT Press.
(7). Carruthers, P. (1992) *Human Knowledge and Human Nature*. Oxford University Press.
(8). __(1996).*Language,Thought and Consciousness*.Cambridge:Cambridge University Press.
(9). ____ (1998). Thinking in Language? Evolution and a Modularist Possibility. In P. Carruthers and J. Boucher (eds.). *Language and Thought*. Cambridge: Cambridge University Press.
(10). _____ (2002). The Roots of Scientific Reasoning: Infancy, Modularity, and the Art of Tracking. In P. Carruthers, S. Stich and M. Siegal (eds.). *The Cognitive Basis of Science*. Cambridge: Cambridge University Press.
(11). _____ (2003). Moderately Massive Modularity. In A. O'Hear (ed). *Mind and Persons*. Cambridge: Cambridge University Press.
(12). ___ (2004a).Practical Reasoning in a Modular Mind. *Mind and Language*, 19, 259-278.
(13). ___ (2004b).On Being Simple Minded. *American Philosophical Quarterly*,41, 205-220.
(14). _____ (2006). *The Architecture of the Mind: Massive Modularity and the Flexibility of Thought*. Oxford: Oxford University Press.

(15). _____ (2007). The Creative-Action Theory of Creativity. In P. Carruthers, S. Laurence, and S. Stich (eds.), The Innate Mind: Volume 3: Foundations and the Future. Oxford: Oxford University Press.
(16). ____ (2008). An Architecture for Dual Reasoning. In J. Evans and K. Frankish (eds.), In Two Minds: Dual Processes and Beyond. Oxford: Oxford University Press.
(17). Carston, R. (1996): Enrichment and Loosening: Complementary Processes in Deriving the Proposition Expressed. *UCL Working Papers in Linguistics* 8: 1-30.
(18). _____ (1997) Relevance-Theoretic Pragmatics and Modularity. *Working Papers in Linguistics*, Vol. 9, University College London: Dept. of Phonetics and Linguistics.
(19). Chomsky, N. (1980). *Rules and Representation* . Oxford: Blackwell.
(20). Cosmides, L. (1989). The Logic of Social Exchange: Has Natural Selection Shaped How Humans Reason? Studies with the Wason Selection Task. *Cognition*, 31, 187-276.
(21). Cosmides, L. & J. Tooby (1992a). *The Adapted Mind: Evolutionary Psychology and the Generation of Culture*. Oxford: Oxford University Press.
(22). _____ (1992b). Cognitive Adaptations for Social Exchange. In: *The Adapted Mind*, ed. J. Barkow, L. Cosmides & J. Tooby. Oxford: Oxford University Press.
(23). _____ (1994). Origins of Domain Specificity: The Evolution of Functional Organization. In: *Mapping the Mind. Domain specificity in Cognition and Culture*, eds. L.A. Hirschfeld & S.A. Gelman. Cambridge: Cambridge University Press.
(24). _____ (1995). From Function to Structure: The Role of Evolutionary Biology and Computational Theories in Cognitive Neuroscience. In M. Gazzaniga (Ed.), *The Cognitive Neurosciences*. Cambridge, MA: MIT Press.
(25). Cummings, L. (2005) *Pragmatics: A Multidisciplinary Perspective*. Edinburgh: Edinburgh University Press.
(26). Dehaene, S., & Cohen, L. (1995). Towards an Anatomical and Functional Model of Number Processing. *Mathematical Cognition, 1*, 83–120.
(27). Duchaine, B., Yovel, G., Butterworth, E., & Nakayama, K. (Duchaine et al.) (2004). Elimination of all Domain-General Hypotheses of Prosopagnosia in a Single Individual: Evidence for an Isolated Deficit in 2nd Order Configural Face Processing. *Journal of Vision, 4*, 214.
(28). Fodor,J.A.(1975).*The Language of Thought*. Cambridge, MA: Harvard University Press.
(29). ___ (1983). *The Modularity of Mind.* Cambridge, MA: MIT Press.
(30). _____ (2000). *The Mind Doesn't Work That Way: The Scope and Limits of Computational Psychology*. Cambridge, MA: MIT Press.
(31). Fromkin, V.A. (1991). Past, Present, and Future Studies of Brain, Mind, and Language. *Proceedings of LP'90.* Edited by B. Palek and P. Janota. Prague: Charles University Press. 9-32
(32). Gardner, H. (1985). *Frames of Mind: The Theory of Multiple Intelligences.* London: Heinemann.
(33). Garfield, J.L. (Ed.). (1987). *Modularity in Knowledge Representation and Natural-Language Understanding*. Cambridge, MA: MIT Press.
(34). ___ (1994). Modularity. In S. Guttenplan (ed) *A Companion to the Philosophy of Mind*. Cambridge, MA: Blackwell, 441-8.
(35). Grice, H.P. (1967) Logic and Conversation. *William James Lectures*, Harvard.
(36). ___ (1969). Utterer's Meaning and Intentions. *Philosophical Review* 78: 147-177.
(37). ____ (2001). *Aspects of Reason.* Oxford: Oxford University Press.

(38). Hermer, L. & Spelke, E. (1996). Modularity and Development: The Case of Spatial Reorientation. *Cognition* 61:195–232.
(39). Kahneman, D. (2003). A Perspective on Judgment and Choice: Mapping Bounded Rationality. *American Psychologist, 58,* 697–720.
(40). Kanwisher, N. (2000). Domain Specificity in Face Perception. *Nature Neuroscience, 3,* 759–763.
(41). Karmiloff-Smith, A. (1992). *Beyond Modularity: A Developmental Perspective on Cognitive Science*. Cambridge, MA: MIT Press/Bradford Books.
(42). _____ (1994). Precis of Beyond Modularity: A Developmental Perspective on Cognitive Science. *Behavioral and Brain Sciences* 17, 693-745.
(43). Kasher, A. (1991). On the Pragmatic Modules: A Lecture. *Journal of Pragmatics*, 16:381-397.
(44). Kripke, S. (1982). *Wittgenstein on Rules and Private Language*. Cambridge: Cambridge University Press.
(45). Leslie, A. (1994). ToMM, ToBY and Agency: Core Architecture and Domain Specificity. In: *Mapping the mind*, ed. L. Hirschfeld & S. Gelman. Cambridge: Cambridge University Press.
(46). Lieberman, D., Tooby, J., & Cosmides, L. (2003). Does Morality Have a Biological Basis? An Empirical Test of the Factors Governing Moral Sentiments Relating to Incest. *Proceedings of the Royal Society London. (Biological Sciences), 270* (1517), 819–826.
(47). Marr, D. (1982) *Vision*. W.H. Freeman: New York.
(48). Newell, A. and H. Simon. (1972) *Human Problem Solving.* Englewood Cliffs, NJ: Prentice Hall.
(49). Piaget, J. (1971). *Biology and Knowledge.* Chicago: University of Chicago Press. Originally published in 1967.
(50). Pinker, S. (1994) *The Language Instinct*. William Morrow and Company.
(51). _____ (1997). *How the Mind Works*. Harmondsworth, UK: Penguin.
(52). _____ (2005). So how *does* the Mind Work? *Mind and Language, 20,* 1–24.
(53). Pléh, C. (2000). Modularity and Pragmatics: Some Simple and Some Complicated Ways. *Pragmatics*, 10, 415-438.
(54). Rozin, P., Haidt, J., & McCauley, C. R. (Rozin et al.) (2000). Disgust. In M. Lewis & J. Haviland (Eds.), *Handbook of Emotions* (2nd ed., pp. 637–653). New York: Guilford Press.
(55). Samuels, R. (1998). Evolutionary Psychology and the Massive Modularity Hypothesis. *British Journal for the Philosophy of Science*, 49, 575-602.
(56). Scholl, B. J. & Leslie, A. M. (1999). Modularity, Development and 'Theory of Mind'. *Mind and Language*, 14, 131-153.
(57). Smith, N. and I. Tsimpli (1996). Putting a Banana in your Ear. *Glot International* 2, 28.
(58). Spelke, E. S., Breinlinger, K., Macomber, J., & Jacobson, K.(Spelke et al.) (1992). Origins of Knowledge. *Psychological Review, 99,* 605–632.

(59). Sperber, D. (1994). The Modularity of Thought and the Epidemiology of Representations. In: *Mapping the Mind,* ed. L. Hirschfeld & S. Gelman. Cambridge: Cambridge University Press.
(60). _____ (2000). Meta-representations in an Evolutionary Perspective. In: Sperber, D. (ed.): *Meta-representations.* New York: Oxford University Press.
(61). Sperber,D.&Wilson,D.,(1986).*Relevance:Communication and Cognition*.Oxford: Blackwell.
(62). **_____ (2002). Pragmatics, Modularity and Mind-Reading. *Mind and Language,* 17, 3-23.**
(63). Tooby, J.,& Cosmides, L. (1995). Foreword. In S. Baron-Cohen, *Mindblindness* (pp. xi–xviii).Cambridge, MA: MIT Press.
(64). **Verschueren, J. (1999). *Understanding Pragmatics*. London: Arnold.**
(65). Whorf, B.L. (1956). *Language, Thought and Reality*. Edited. by J. Carroll. Cambridge, MA: MIT Press.
(66). **Wilson,D.& Sperber D.(1993).Linguistic Form and Relevance, *Lingua,* 90/1-2, 1-25.**

الخلاصة :

يتكون العقل حسب نظريات الوحدات العقلية من منظومات معرفية متخصصة لكل منها طريقتها الخاصة في تمثيل ومعالجة المعلومات، وتكون هذه المنظومات على نوعين .يتمثل النوع الأول في منظومات إدخال وإخراج المعلومات وعادة ما تكون هذه المنظومات عبارة عن وحدات متخصصة لمعالجة نوع واحد فقط من المعلومات (كالحواس ووحدة إنتاج اللغة).ويتمثل النوع الثاني في منظومة مركزية لاتكون وحدة منفصلة بل لها القدرة على الاستفادة من مخرجات الوحدات الأخرى من معلومات.يقدم البحث مراجعة لجميع الآراء والتوجهات التي تتناول طبيعة موقع التداولية في العقل .ويقدم البحث نموذجا يسميه بهيكل العقل المتعدد المستويات والذي يرفض اعتبار التداولية وحدة عقلية قائمة بذاتها او جزءا من وحده نظرية العقل وكما يرفض النموذج الجديد اعتبار التداولية كناتج لعملية تشكل الوحدات أو اعتبارها وحدة فطرية بل افترض النموذج الجديد ان التداولية عبارة عن مجموعه من المبادئ في شريحة المعرفة العليا والتي تستخدم في حل أنواع متعددة من المشاكل . وعليه فان البحث الحالي يرى التداولية كمجموعة من المبادئ التي لاتنتظم في وحده وتستخدم لأغراض متعددة منها اللغوية.