

HUMAN SPECIFICS AND LEARNING: RELATIONSHIPS BETWEEN COGNITION, AFFECT AND CULTURE¹

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Abstract: The article aims to discuss issues related to frequent controversy in the Psychology of Learning, which consists on the relationships between cognition, culture and affect, and human specificity on these processes. Thus, learning is discussed in terms of shared processes with other species such as association and recursion, and others that are specifically human, such as abstraction and metacognition. We examine some hypotheses about how the human mind may have evolved to develop these differences. At the conclusion, it is specified the position about the links between cognition, affect and culture in two levels of psychological functioning, and the decisive role of culture and its main instrument, language, in favoring the development of human specificity.

Keywords: Learning. Cognition. Affect. Culture.

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Introduction

Important issues related to learning, like which psychological processes are exclusively human and the relation between cognition and affect face recurring controversy (Bodmer, 2007; Boesch, 2007). It is likely that this debate happens, at least in part, due to problems of definition of the phenomenon being discussed. As De Waal and Ferrari (2010) point out as an example, imitation, has been progressively defined as a mental process subordinate to other superior processes, like understanding the objective of the action to be imitated. In this sense, these authors see beyond much inaccuracy in the definition of cognitive capacities, problems in its measurement, which, in our point of view, is closely related to the discussion about the relation between affect and cognition.

Aspects considered by researchers as distinctively human vary from language to habits of cooking food, including the ability to mentally travel in time, theory of mind, imitation and others (Bodmer, 2007). As it will be opportunely analyzed regarding the relation between cognition and affect, one can discern antagonistic positions between researchers besides little concern with a precise definition of the processes being investigated. However, what is ascertained in both discussions is that these analysis are based on different theoretical conceptions about psychological functioning, as well as what regards to the issue of psychological continuity between species, as postulated by Darwin (Boesch, 2007). Therefore, in many conceptions about human specificity, one observes the absence of concern with underlying mental operations that allow for its materialization. In a similar way, many authors of these proposals are not concerned with the implications of postulating total discontinuity between humans and other species. The objective of this article is precisely to discuss these positions, valuing the involved mental operations and consequently, the issue of continuity between species.

Thus, it will initially be clarified, how and from what point of view important processes for these human specificities are defined, starting from learning and proceeding to the relation between cognition, affect and culture. It is important to point out that the main concern of this article is not to identify a psychological characteristic that is distinctively human, but, rather, to go beyond this and analyze its implications, that is, the issue of continuity between species and the role of culture concerning mental processes, pointing issues that need to be clarified in these explanations.

Learning, cognition and its evolution

Learning, defined as a lasting process of change and produced by experience, has a strong adaptive nature in virtue of an advantage conferred to organisms that modify themselves in response to what is experienced in the environment. As an adaptive process, learning occurs in most species and has a potential for modification through experience transmitted to the next generations. This potential for modification due to what is experienced may promote variability between individuals and populations (Boesch, 2007). However, what is least remembered – except by theorists like the behaviorists – is that learning may also promote similarity between species. This is due to the fact that similarity does not only come from shared ancestry, but also from common selective pressures; as is argued in phylogenetic studies. These studies further state that the learning processes tend to be of a most stable and general nature, as is seen in association, which is present in all bilateral species. Research data from biologists show that natural selection acted more frequently in other processes associated to learning, such as: sensorial, motor and motivational, allowing for the evolution of new behavioral capacities (Pappini, 2002).

As it would be expected due to the importance attributed to biological endowment, this conception about the differentiated performance of selection – which in this case is more about processes like perception than about mechanisms like association – is found in neuroscience research, whose influence on Psychology has become increasingly greater. Researchers that investigate the action of mirror neurons, like Gallese (2007), based on neuroimaging results, propose that the activity of this system is triggered when some primates and humans observe the action of another individual, which may explain the most primitive social cognitive mechanisms as well as the most complex, like linguistic communication, a typically human mechanism. The explanation for such, like what is argued above, would be the adaptation of basic mechanisms of sensory-motor integration, in order to develop new functions without losing its original functions. This happens because the execution of any complex coordinated action, like grabbing an object, for example, involves motor areas of execution as well as of premotor control and coordination. According to this hypothesis, the same system that controls how our bodies move and allows our comprehension of other's actions may also structure language and abstract thought. This would be possible in virtue of greater computational and recursion power of the human pre-motor cortex. Thus, the difference between species concerning cognitive processes would only be a matter of degree, as proposed by Darwin, and not qualitative, and therefore would not happen

discontinuity in this aspect. Although Gallese's hypothesis is more parsimonious, the attribution of such explanatory power to recursion as a cognitive process shared in the phylogenesis is not a consensus in Psychology.

This happens because recursion of human thought is discussed precisely as an indicative of discontinuity between species by researchers like Corballis (2007). In his discussion, recursion is defined as assertions that take themselves as references. Corballis (2007) believes that even among human beings recursion is limited by our memory's work capacity. Recursion may be observed, for example, in our ability to infer the psychological state of the other, in the so called theory of mind, from the most simple affirmations like "It seems to me that you consider me to be a good person" until others, much more complex, like "Maria thinks Ana wants João to give me the gift, even though he is not aware of this." Other aspect of human thought in which recursion is manifested is in our ability to mentally travel in time. Our episodic memory, which allows us to recover the past and project ourselves in the future, also depends on the reference over a reference, in other words, recursion. Therefore, based on what has already happened, we can create similar scenarios in the future, like in the following statement as an example: "At this time he must have already arrived." As far as we know, only more evolved primates like chimpanzees demonstrate having some episodic memory – for example remembering the place where they hid their food – but they have no concept of past and future. Even in regards to tools, the skills that we share with capuchin monkeys that use tools regularly, Corballis reminds us that only humans are able to manufacture tools in order to make other tools; another type of recursion. Thus, for Corballis (2007), distinctively human psychological characteristics would be those that involve recursion like: language, the consciousness of knowing oneself, theory of mind, ability to travel in time, ability to make tools in order to create other tools and the ability to narrate. He further considers that the fact that recursion is present in so many functions of the human psyche indicates that it is most likely a general ability, a form of operation applicable to various mental processes. This would be processed in the frontal lobes, whose expansion in the evolution of the human species may explain this acquisition.

This type of explanation about the evolution of recursion in the frontal lobe is shared in other fields of knowledge, like in archeology. Mithen (2002), an exponent in this field, discusses which factors distinguish the human mind as human, and if there is reason to think about the issue of psychological continuity between species. This is due to the fact that the problems that needed to be solved at the time that *homo sapiens* evolved were very different from current problems, which renders the conception

of mind operating through general processes as being more adaptive than the one conceived as functioning entirely through modules, as is proposed by Fodor (1985). In Mithen's (2002) point of view, an analogy that would accurately represent his conception about the evolution of the human mind would be what happened with medieval churches. These began as a simple entrance hall, with some entries; in the case of a human mind, data derived from sensory organs. This space became more complex with the addition of "lateral naves" surrounding the first, which in the mind would be the functions that transform sensory data into representations, initially functioning in a completely isolated and independent way. These modules developed into specialized intelligences, such as naturalistic, technical and social. The process completed itself with the addition of a "central nave," to where information processed into the modules converged, allowing access to its content. The central nave would correspond to our brain's most recent structure, the pre-frontal cortex, which integrates and manages the actions and representations processed in other structures. It is highly likely that at least a part of these actions is dedicated to the transformation of representation of information via recursion, as Corballis (2007) supposes. In summary, it is ascertained that in Mithen's perspective, the mind evolved as a result of the evolution of the brain, which was caused by adaptive pressures like the bipedalism and group life. The last reason is considered to be the most decisive in order for the mind to generalize itself and become representational with language. Culture would be a consequence of these adaptations when religion, art and agriculture emerged.

This position about how human cognition operates may be even more radical. In a very provocative article, entitled: "Darwin's mistake: Explaining the discontinuity between human and nonhuman minds," Penn, Holyoak and Povinelli (2009) argue that culture and language may effectively explain some differences between humans and other species, but they do not grasp all our specificity. In their opinion, these differences derive from a computational system developed by humans in order to deal with relations such as similarity, identification of rules, making inferences and establishing causal and hierarchical relationships – abilities considered not mastered by other species. To cite some differences included in the extensive list presented by the authors, one cognitive operation that does not present much difficulty is the judgment of similarity, which occurs in two levels of human thought. The most basic and fundamental for survival consists of evaluating perceptual similarity, based on the relationships observed between stimulus' common characteristics. A second and more sophisticated type would be the evaluation of relational similarity, which is not directly observable, and is based on similarities between functions that the elements perform in

these relationships. An example would be to identify the existing similarity between the nest and the hive in terms of its function, which a child is capable of doing, but not other species.

The capacities of primates to make transitive inferences are also restricted to the observable and are specific to a context. This is different from humans that infer without this restriction. Children without any concrete numerical data are able to infer that if A is greater than B and B is greater than C, then A is greater than C. Transitivity observed between primates is limited to social relationships, for example, the submission to a new specimen after observing this same reaction in a dominant member of the group. Human beings go beyond; probably predicting how other members of the group would react to a new dominant, based on a logic of relations.

Among the many hypothesis examined by Penn et al. (2008) in order to explain our capacity to think about relations in a decontextualized way, it is worth to single out language, which is credited with an important role in our capacity for abstraction. This happens because language favors the apprehension of relations, including social relations. However, language is not enough to explain all the differences, for there is evidence of complex mental operations in its absence. Even if language reorganizes the functioning of the mind, remains the question of why it does not do the same with primates that were taught to use language, associating chips or gestures to objects and actions. These primates have even developed sensibility to the order in which these "symbols" are presented when interpreting new sentences. But, even with many years of training, none of these animals has shown control over abstract grammatical categories, hierarchical syntactic structures, or any other trait distinctive of human language. For the authors, these limitations show that learning a language cannot humanize a mind. Besides, many aspects of human cognition that differentiate us from other species are not specifically linguistic, like establishing hierarchical relationships or non-observable causal mechanisms. Furthermore, they ask: what would be the use of knowing how to communicate relations that have not been understood? Everything points to the assumption that language is derived from these operations and not the other way around, where language is one among other factors that has propelled our cognition into an abstract relational way of operating.

Thus, we consider reasonable to ask: what other mental operations, besides recursion, have developed allowing for the abstract thought?

In search for this explanation, Penn et al. (2008) debate some theoretical possibilities originated in Cognitive Psychology, among which relational reinterpretation is considered to be the most plausible because it would explain why we are capable of reinterpreting the world in terms

of non-observable entities, like mental states. Similarly to what Karmilloff Smith (1994) proposed in her representational re-description, the authors suggest the existence of two systems of thought: one more automatic, based on data from perception, and the other dedicated to the reinterpretation of representations produced by the first. In order to explain reinterpretation, they propose a synchronized operation of associative and synthetic processes in the pre-frontal cortex, which support working memory. It is important to stress that they admit that the model was still incipient and did not explain metacognition, for example. Karmiloff Smith (1994) explains how metacognition operates, for she considers that the levels of thought, automatic and controlled, start to interact right at the start of life, creating alternative representations to those originated from perception. Thus they become subject to more general mechanisms like representational re-description, which consists of control and deliberate manipulation of mental representations in order to explicit and modify them. One example of this process would be imaginative play, in which the child suppresses an aspect of the stimulus, for instance, the function of sweeping the floor, replaced by that of a riding device. Culture would have an important role in domains that emerge from existing modules; in other words, the type of stimulation received will have an impact in the subsequent development of some skills and not others, like mathematics in contemporary societies, which would be based on an intuitive physics.

In summary, positions examined until now emphasize not only the essentially human capacity to establish abstract relationships, but further, that this capacity would be based on recursion. Although it is shared with other species, human recursion would have a much greater power of abstraction in virtue of representations over representations may consist of interpretations and re-descriptions of perceptions, for example, seeing multiple uses for a tool. In this sense, some cognitive continuity with other species would be in principle be preserved, the difference consisting in degree of power of the processed representations. In view of these differences, it is worth remembering Boesch's (2007) warning about comparisons between primates and humans. These comparisons, in his opinion, are based on studies that put primates in disadvantage in relation to human beings because they are animals raised in captivity, tested by an individual from another species, from whom they are separated by a physical barrier, and in the absence of their mothers. The author states that the differences are much smaller when these unfavorable conditions are eliminated. On the other hand, ignoring the possibility of evolutionary leaps between the species may also constitute an error, as is noted by Solero de Campos and Winograd (2009).

Another noteworthy aspect is that transformations of representations could be performed by means of metacognition, which

according to Flavell (1999), would consist in both the control and understanding of our cognitive activities. Having in mind the importance of this form of abstraction, it is worth examining a few hypotheses regarding how the human mind might have evolved from mechanically associating to a deliberate search for explanation and changes of conceptions, meaning a more abstract and controlled way of operating. For some of the authors already examined, culture and language performed a relative role in this evolution because they attributed more importance to the joint influence of bipedalism, freed hands, and increase in brain size. However, others, as will be examined in the following, consider the influence of culture much more decisive, postulating coevolution between culture and the increase on the ability to abstract in the human being.

One of these explanations is proposed by Donald (1993), which was criticized in some archeological aspects by Mithen (2002). Nevertheless, it is worth examining his explanation along with Corballis' (2009), because they specify, even if hypothetically, the processes by which culture and language have influenced the evolution of capacity for human abstraction. Coming from the hypothesis that mind and culture coevolved, and also being based on archeological data, Donald (1993) proposes that evolution towards greater abstraction and control of representations happened through three great cognitive transitions. These gave origin to new forms of mental representation that also had an impact over culture, in an interplay of reciprocal influences, each one promoting the other's transformation. The starting point is the representation of an episodic world, shared with primates like chimpanzees, which allows for the localization of stored food and orientation in space through intuitive physics, for example.

The first transition corresponds to the emergence of mimesis in social interactions, based on a corporal system of representation that not only turns communication more complex, but also perfects the use of tools. Here it is worth adding Corballis' (2009) contribution, that also postulates that communication started through mimesis. In his point of view, this made the communicative process not only more flexible, but also more complex. This happens because, differently from vocal communication, like warning shouts, it demands attention from the interlocutor. This form of representation allows for a more elaborate communication, and also a primitive form of "pedagogy" through means of imitation, differentiating social roles and making life in group more complex.

Continuing with Donald's (1993) proposal, the second transition would correspond to the invention of lexicon, a symbolic representation that has accelerated phonological evolution, that was already being processed with a series of neural and anatomical modifications for speech.

With these advances, metalinguistic abilities were developed to regulate the use of words and narrative thought. All these changes significantly amplified the ability to represent reality, propitiating the advancement of knowledge. This happens because they created a new level of shared representations, favoring thought, and communication about an object in its absence, favoring perception of other forms of giving meaning to reality, and of organizing and preserving knowledge.

Here it is worth mentioning another contribution from Corballis (2009) who supposes that syntax must have sprung at this moment, to reduce the great quantity of terms necessary to refer to what has been lived and is not directly accessible to the interlocutor. This need must have led to the creation of rules in order to refer to episodic elements in an economical way, like verbal tenses when referring to the past, for example. Corballis (2009) defends that language and ability to mentally travel in time must have coevolved, for communication about events can create episodic memories in the interlocutor, contributing to the development of this type of thought, favoring his adaptation to similar conditions in the future.

The third transition postulated by Donald (1993) was the externalization of memory, through the invention of writing. This innovation contributed to freeing memory from an overload caused by the need to orally reproduce knowledge in order to preserve it. It further allowed for the diffusion of information, and thanks to the freeing of memory, the realization of other mental operations about knowledge, like reflection, discussion, transformation and explanation, all of which are fundamental to its advancement.

In summary, the several explanations for the specificity of human cognition examined so far emphasize the role that life conditions in a society have had in order for the mind to evolve, differing in the importance attributed to each to culture. The conception of a gradual coevolution of mind and culture, leading to increasingly abstract forms of representation and communication among human beings seems to be the most adequate. Other social beings like primates, although they have developed a more general capacity for representation than other species, have not developed it at the same level of abstraction that we have. This indicates the intervention of other factors besides living together and the consequent need to predict someone else's behavior. It all indicates that the power to create representations of superior order and to exert some control over them through metacognition allows the human being to go beyond perceptive data, or the simple prediction of someone else's conduct, seeking to understand and participate in the other's action. It is worth remembering that theory of mind or intersubjectivity, a condition necessary for culture is defined as a form of metacognition by some authors like Veenman, Wolters and Affenbach

(2006). An explanation of what made human beings develop this type of ability, in other words, the motivation to understand the other and become cultural, will be examined in what follows.

Cognition, affect and culture from the perspective of Cultural Psychology

In a very similar position to that of Donald and Corballis, which has already been examined, Bruner (1998, 2001) considers that the possibility of becoming cultured is what differentiates human cognition from that of other species. Bruner regards culture as knowledge of the world, implicit and not completely interlinked, which allows us to reach satisfactory means of action in determined contexts through negotiations with others.

In this perspective, culture demands intersubjectivity, which is the ability to represent the other's mind, consisting its base. In other words, what allows us to go beyond mere living together, exchanging meanings and cooperating, is our capacity to represent the other as really another person, gifted with feelings, desires, and beliefs, and our ability to communicate with the other in this perspective. Language would have a fundamental role in this process of representing the other's mind because it allows the development of networks of common meanings over which culture is built, and functions like a scaffolding that levers our psychological capacities. The motivation to adapt to a group and share knowledge comes from a bond of affect established by the child with his/her primary caretaker. The child, due to his/her dependence on an adult for survival, attends in an early and differentiated manner to the adults' initiatives for interaction and responds in a syntonized way. A good example would be that of shared attention, which happens around eight months, evidenced by the fact that the child follows the direction in which the adult is looking at, staring at the same point as he is.

The defense of intersubjectivity as the base for culture establishes perhaps a greater separation than those already examined between human psychological functioning and that of other species. This was already a concern for Bruner in the 1970s when he observed similarities between primates and humans in terms of their capacity to learn through observation, and to imitate what they observed in play (Bruner, 1972). However, at that point he had already observed differences, like the capacity to reproduce the observed according to a goal, and learn through deliberate teaching. More recently, Bruner (2001) goes beyond this, pointing out that except for a few manifestations like trying to deceive the other in regards to the location of food, the capacity developed by

humans to symbolically infer and represent foreign mental states has not yet been verified among primates, which he considers to be crucial for culture. Furthermore, he postulates that this capacity of really representing the other as an other individual must be based on pre-linguistic dispositions in order to be able to attribute meaning. In other words, a predisposition to syntonize with the other in order to attribute meaning to his action. According to Bruner, language also depends on pre-linguistic aptitudes to attribute meaning, some of them actively sought by humans, with which they are innately syntonized. These would be the social.

Tomasello, Carpenter, Call, Behne and Moll (2005) adopt a similar position to Bruner's regarding the relation between culture and cognition, but that goes beyond the motivation to be aware of the other in the explanation of human specifics and differences with other species. In this perspective, human cognition excels primate cognition – from where it originates – in view of its diversity, complexity and variability between populations. It is rooted in primate cognition, but is differentiated from it as it provides motivation and cognitive tools to collectively create artifacts and practices that structure interaction between individuals. According to Tomasello et al. (2005), a small difference, that by generating the possibility of culture and its evolution, has caused an enormous change in human cognition. This small difference consists of adaptation occurred in the species, of sharing in collaborative activities involving shared intentionality. This ability to share intentions led to selection of intention reading skills, as well as motivation to share psychological states with others during human evolution. In human ontogeny these two components, understanding of intention and motivation to share, have been combined since the beginning, producing a unique trajectory for cultural cognition in terms of modes of social involvement, symbolic communication and cognitive representation. In this sense, Tomasello et al. (2005) disagree with the conception that language would be responsible for the differences between human and primate cognition, because, like the other authors already examined, this difference is derived from something greater, the human capacity to read and share intentions that also support declarative gestures, imitative learning etc.

It is important to note that the emphasis in the sharing of intentionality and comprehension defended by Tomasello as fundamental elements for human cognitive and symbolic development does not constitute a consensus in Psychology, as is stated by Allán and Souza (2009). The authors remind us that intentionality should be better defined so that it does not represent a return to mentalist proposals in regards to cognition.

Summarizing these two very close perspectives, Bruner's and Tomasello's, we find that they attribute the specificity of human psychological functioning to social predispositions like prediction of

foreign behavior, including others shared with other species. Other specificities like understanding the other's intentions, and adjusting to the other allow humans to easily learn how to communicate, cooperate and become a member of culture. This, in Bruner's (2001) conception, in as much as it evolves, "levers" human cognition in a way that is similar to what the invention of syntax did to language: simplified and amplified it, making communicative potential more complex.

In conclusion, the analysis of the examined positions evidence that even for the advocates of culture as a differentiator in human psychological functioning, its influence is only possible if a few cognitive abilities are present. Intersubjectivity, comprehension of other's intentionality and cooperation, which are all based on the capacity to represent over representation, would be the elements that have led to life conditions with shared meanings that we call culture. For those who object to this role of culture as a differentiating factor, our cognition evolved in virtue of the joint action from other adaptations like bipedalism and increase in brain size, that have allowed for the capacity to operate in an abstract way, represent over representations, and even execute these operations in a deliberate and explicit way through metacognition. It is worth noting that among the supporters of culture as a differentiating factor, there would be a predisposition to interact with the other, attribute meaning to his action, and interpret, in sum, a predisposition to go beyond immediate perceptive data, indicating a motivation to learn within a given context. Despite motivation to learn is one of the less controversial relationships between affect and cognition within Psychology, the relations between the two processes are discussed in a polemic context very similar to that previously examined.

Affect, cognition and possible interactions

Before dealing with the influence of affect as a motivation for learning, and therefore, its relation with cognition, it is worth situating the theoretical context where this analysis occurs.. As stated above, a debate very similar to that previously examined occurs in the field of conceptions regarding the relation between affect and cognition, where we find supporters of the independence between the two phenomena, indeed processed in distinct cerebral systems, and others that support its integration. These divergences become apparent when definitions of affect are sought out in literature.

Affect, besides rarely being defined in the research that investigates it, is named in various ways, like affect, emotion, and sentiment to refer to what seems to be the same type of phenomenon. According to Duncan and Barrett (2007), affect may be defined as any state that represents how

an object or situation impacts a person. These authors claim that affect would be a form of cognition, for according to Neisser's (1967) definition, it refers to all processes in which the sensorial input is transformed, reduced, elaborated, stored, recovered and used. In another point of view, for authors like Bruner (1998), the concepts of cognition and emotion are simple abstractions, or two mental states thus distinguished due to phenomenological experience. This distinction is probably derived from the difference of a sense of control that we have over these two processes. For example, we may decide the content of our thought, but we may not decide to feel an emotion without directing thought to a context or event that evokes it, which confers an automatic character to affect. However, we believe that few human beings would agree that our subjective experience would be of such a disassociation of states like: "now I think, now I feel." Another important question pointed by Storbeck and Clore (2007) is that the conception of cognition kept by many researchers as something conscious and rational is too restricted for it does not apply to many learning processes as association. Another important point remembered by the same authors, is the distinction between hardware and software proposed by Cognitive Psychology when adopting the computational metaphor, which has legitimized a certain form of dualism between mind and body in Psychology. In this perspective, affect through its relation with sensations would have a more corporal character while cognition would have a more mental one.

However, historically situating the debate between conceptions about the relation between these two phenomena may help clear up the issue. What is ascertained in this debate is that the view of independence between both phenomena is older than that of integration, and is based on three very similar hypotheses: a first would be that it postulates the processing of affect in a path distinct from cognition, called the inferior route. The second is that which proposes the primacy of affect over cognition, and finally, the last hypothesis is that of the automaticity of affect.

The first hypothesis, of preferential processing of affect through the inferior route, comes from the assumption that the two processes operate in distinct systems and that this route acts in an autonomous way, without cortical influence. The existence of this route in human beings is subject of debate according to Storbeck and Clore (2007), who argue that processing performed through this route has little or no power of discriminating stimuli. Besides, when the visual cortex is deactivated in monkeys, stimuli that elicit fear do not arouse this reaction, which in their opinion, demonstrates that the amygdala operates within the cognitive system.

The hypothesis of the primacy of emotion is based on Zajonc's proposal made in the 1980s over mere exposure; phenomenon that

involves an affective reaction, not only distinct, but one that still precedes a cognitive response (Zajonc, 1980). This argument is based on the conception that memories associated to affective priming produce these emotional responses without a conscious cognitive processing, which was actually verified through research, but it is restricted to those given through simple valuing of stimuli from a same category. In tasks that involve evaluating more than one category of stimuli, like animals and objects, a delay in response was observed, evidencing that a semantic activation took place, in other words, a cognitive one. Storbeck and Clore (2007) are some of the authors that have issues with this hypothesis, the greatest one being in the equivalence of cognition to conscience, which does not always proceed, as is previously mentioned. Besides, such a conception tends to exclude the already verified existence of cognitive processes in animals and babies (Eder, Hommel & De Houwer, 2007).

The automaticity of affect is also defended based on the allegation that emotion is discharged by the amygdala, a cerebral structure shared with other species, responsible for processing before the information is processed in the sensorial cortex. This disassociation is also contested by Storbeck and Clore (2007) based on the argument that such a discharge in some way involves the cognitive system because the stimulus needs to be identified or recognized in order to provoke a reaction, which would be done by the sensorial cortex. However, it is worth remembering that the argument from which the hypothesis of automaticity is based on is its value for survival, which is related to the issue of continuity between species that has already been discussed.

It is further important to add that research regarding affect was only consolidated in the 1990s due to methodological and ethical difficulties involved, which were firstly sidetracked with the use of research methods derived from the study of cognition, and more recently, psychophysiology (Eder, Hommel & Houwer, 2007). The use of methods derived from research about cognition, like self-reports, raises objection from supporters of the independence of these two phenomena because they may cause interference of cognitive processes of appraisal, seen as being different from evaluation, more experiential, and older phylogenetically due to its value for survival. According to these positions, some specific emotions like fear are processed in areas without important connections, or directly connected like the amygdala and thalamus, which would process "raw" sensorial information (Eder, Hommel & Houwer, 2007). This direct connection would explain the independent operation of emotion, favoring the conclusion that affect and cognition are much better conceived as separate mental functions, but, at the same time, they are interactive due to the mediation of cerebral systems that are also separate and interactive.

Considering that there are some evidence pointing to the automatic processing linked to survival, and possible interference of cognition in

research about affect due to the use of self-report instruments, the most plausible conclusion at the moment is that there are indications of two levels of processing of affect, similar to what has already been analyzed in regards to cognition. One more automatic, independent of cognition, would be restricted to a very simple processing of stimuli, valuable for survival. The other involves cognitive processing, where are in interaction processes from various structures, like amygdala, sensorial cortex and pre-frontal cortex.

Affect, cognition and culture: the motivation for learning

In the case of learning, the consensus about the relation between affect and cognition is much older, since Bruner inaugurated the *New Look* in studies of perception in the 1950s, demonstrating that it is not a passive registration of reality, suffering interference of expectations and motivations (Bruner, 1998). Another example of a well-established consensus of these relations is curiosity, seen as a motivation for learning. Conceived as a drive, it is activated by new situations and triggers exploratory behavior, in many species, which is seen as having an adaptive value because it leads to an acquisition of knowledge and adjustment to the environment (Berlyne, 1954).

Coherent to the conception of processing of affect, it is also assumed that the motivation for learning occurs at two levels of functioning. One more ancient, shared with other species, is more automatic, and controlled by novelty, as in the already mentioned case of curiosity. Another more complex level would be the goals for learning, that involve more cognitive and affective dimensions, are processed in a more deliberate way, and are therefore under the intervention of conscience.

These last functions would be more present in cognitive processes that involve abstraction, like learning academic or scientific concepts. By frequently involving concepts, second order representations and other relations, whether they be hierarchical or causal, it is necessary to control these operations. In other words, abstraction of elements in most cases is not automatically processed, requiring a deliberate allocation of attention for the use of cognitive strategies. An example would be counter-intuitive scientific concepts, like a whale not being the specimen of a fish. Thus, in regard to skills involved in academic learning, the use of cognitive and metacognitive strategies is fundamental. In this respect, it is worth remembering a very interesting result found through research that shows the relation between this type of motivation and the type of strategy used (Zenorini & Santos, 2003). The motivation for performance, for example, whether it is of success or avoidance of failure, generally leads to a

mobilization of strategies that involve less cognitive effort like mechanical memorization. On the other hand, the motivation for learning in order to dominate a subject, makes use of deeper strategies; either cognitive, such as to summarize, or construct cognitive maps, as well as metacognitive, like planning and others. Besides, the use of learning strategies is related to academic success already at the start of school life, with basic education (Oliveira, Boruchovitch & Santos, 2009).

However, motivation may also be related to variables like culture and socio-economic level as is shown in results found in Dekker and Fisher's (2008) research. These authors carried out a meta-analysis of research done in thirteen countries with the same instrument of evaluation of motivation. They verified that the goal for performance is more commonly found in cultures of interdependence, like eastern cultures, in which more value is given to the bond established with the other. In this sense, social approval would have a greater weight for the individual to present himself as competent. In cultures that emphasize independence from the other, as in western cultures, a greater orientation towards the goal of learning was found, explained by the fact that individuals are stimulated to pursue their own objectives. It is possible that these results may have suffered interference from social desirability due to the influence that the type of bond with the other may have in that certain culture. In other words, disseminated life ideals as what is the most desirable in a given culture may induce a type of response coherent to what is valued. In another point of view, data relative to the interaction of goal with socio-economic level may explain this pragmatic aspect because it was found a predominance of the goal of performance in less developed societies, due to the fact that academic success can improve life conditions. In summary, this is an illustrative example of the possible interactions between affect, cognition and culture in the learning process. These interactions probably occur to modulate psychological functioning, a result of adaptations throughout evolution that differentiated it from other species in terms of greater abstraction and deliberation. Furthermore, it is worth highlighting how distinctively human metacognition is, in other words, the ability to be aware and control our own cognitive activity, monitor and deliberately evaluate the process, and to alter it, restructuring knowledge. Everything indicates that culture has had a decisive influence over these processes, for it does not only define its direction, but also facilitates it more or less, according to the advances in knowledge that it has reached. In this sense, the favored conclusion is that there is both continuity and discontinuity between humans and other species. There would be continuity concerning implicit associative processes and discontinuity at the rate with which it is possible to exert deliberate control over our cognitive functioning.

As especificidades humanas e a aprendizagem: relações entre cognição, afeto e cultura

Resumo: O artigo tem por objetivo discutir questões que periodicamente provocam polêmica na Psicologia da Aprendizagem, que são as relações entre cognição, cultura e afeto e as especificidades humanas nesses processos. Assim, a aprendizagem é discutida em termos de processos partilhados com outras espécies, como a associação e a recursividade, e outros que são especificamente humanos, como a abstração e a metacognição. São examinadas algumas hipóteses sobre como a mente humana pode ter evoluído em direção à essas diferenças. Na conclusão, é explicitado o posicionamento sobre as relações entre cognição, cultura e afeto, em dois níveis de funcionamento psicológico e da influência decisiva da cultura e seu principal instrumento, a linguagem, na promoção das especificidades humanas.

Palavras-chave: Aprendizagem. Cognição. Afeto. Cultura.

Les spécificiques humains et l'apprentissage: relations entre la cognition, l'affect et la culture

Resumé: L'article vise à discuter des questions qui provoquent régulièrement la controverse dans la psychologie de l'apprentissage, qui sont les relations entre la cognition, la culture et l'affect et les spécificiques humains en ces processus. Ainsi, l'apprentissage est discuté en termes de processus partagés avec d'autres espèces, telles que l'association et la récursivité, et d'autres qui sont spécifiquement humain comment l'abstraction et la métacognition. Nous examinons quelques hypothèses sur la façon dont l'esprit humain peut avoir évolué dans le sens de ces différences. En conclusion, il est précisé la position sur la relation entre la cognition, la culture et l'affect, ainsi comme deux niveaux de fonctionnement psychologique, et l'influence décisive de la culture et de son principal instrument, la langue dans la promotion des ces caractéristiques humaines.

Mots-clés: Apprentissage. Cognition. Affection. Culture.

Las particularidades humanas y el aprendizaje: las relaciones entre la cognición, afecto y cultura

Resumen: El artículo tiene por objetivo discutir temas que regularmente provocan controversia en Psicología, que son las relaciones entre la cognición, la cultura, el afecto y las particularidades humanas en estos procesos. Así, el aprendizaje se discute en términos de procesos compartidos con otras especies como la asociación y la recursividad, y otras que son específicamente humanas, como la abstracción y la recursividad. Examinamos algunas hipótesis de cómo la mente humana puede haber evolucionado en hacia estas diferencias. En conclusión, se explicita el posicionamiento acerca de las conexiones entre la cognición, el afecto e la cultura, como de dos niveles de funcionamiento psicológico y la decisiva intervención de la cultura en la promoción de las particularidades humanas.

Palabras clave: aprendizaje, cognición, afecto, cultura.

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