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Learning and/or "Cure"? The notion of learning context in the health ambit

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Mental health is not the object of study of only one discipline, but of different fields of knowledge including anthropology. If it is considered that (1) mental illness is related to learning and (2) learning happens in a relational context between the subject and his/her environment, it is possible to assume that a change in the context could mean changes in the subject's health. Therefore, an approximation to the concept of "cure" may include the idea of building and reforming a habit of thought. By modifying a habit of thought, the individual can change their situation and improve their relationships with the environment, which tends to re-equilibration and health. In this work, this hypothesis is developed and empirical evidence was shown with five Wernicke Korsakoff's Syndrome inpatients learning to solve the Tower of Hanoi that supports the assumptions. Conversely to what is expected to amnesic people, empirical results showed that the participants not only learned the task (*proto-learning*) but also improved their execution with practise and training (*deutero-learning*) and reached some level of flexibility. It is suggested that this behavioural change depends, at least in part, on the context created in the examiner-participant relationship. People are not ill *per se* but they are ill only in relation to an environment which surrounds and conditions them.

Key words: Learning, environment, health, cure.

INTRODUCTION

Despite being associated with the mind-body separation, which is groundless, mental health is not the object of study of only one discipline, but of different fields of knowledge such as cognitive anthropology, medicine, psychology, pedagogy and others. In the case of cognitive anthropology, its aim is to elucidate the underlying principles of behaviour, assuming that each person (and culture) has their own system of perception and organization of the world-environment.

Mental health is one of the main aspects of human behaviour and is characterized by a series of standards or learning thresholds. In this paper behaviour is understood as "(...) all action directed by the organisms toward the outside world in order to change conditions therein or to change their own situation in relation to these surroundings" (Piaget, 1978: IX).

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The notion of *vection* (Piaget, 1977) refers to the gradually increasing opening to new possibilities of interaction with the environment, an increase in open behavioural adaptations which tend to expand the cognoscibility and liveability of the environment. While the occurrence of internal movements such as blood circulation or the changes produced by the function of respiration on the atmosphere are not understandable as behaviours, it is assumed that behaviour tends to modify the relationships between the organism and its environment (Piaget, 1978).

Lahitte and Hurrell (1990) explained the difference between activity and behaviour since, if speaking about behaviour, the term needs to be referred to a context of significance: the intentional factor of behaviour makes it capable of being explained in communicational terms. According to the context of observation, acts will be qualified as behavioural or non-behavioural because the concept of behaviour depends on the context in which the observation (of the behaviour) was made.

Behavioural relationships are not internal to the individual: although changes occur in the terms of the relationship which correspond to its dependence-protection, the relationship as such is precedent. That means that the understanding of behaviour through the concept of relationship yields to a novel logical kind of learning which was named by Bateson (1993) learning II or *deutero-learning*.

In this context, it is possible to address different kinds of learning, which is understood as changes in behaviour acquired through experience (frequently by repeated experience) which propitiate the adaptation of the organism by means of re-equilibration and self-regulation. In this paper mental health is seen as closely related to the individual's learning:

"Lo que en algún momento entendíamos como enfermedad o patología o desviación social son, en realidad, nuevas propiedades que adquieren los seres humanos cuando alteran su condición de equilibrio. Estas formas que podríamos entender como nuevas propiedades se estabilizan como patologías en las que el sistema, el sujeto en su conjunto es sometido a fuertes condicionamientos del medio (relacional, familiar, escolar…)." (Lahitte and Ortiz Oria, 2005: 89)[1]

As far as the authors of this paper know, the perspective of learning in mental health from an anthropological-educational point of view is not an usual issue in the health bibliography; therefore, this work tends to contribute with a perspective which intends to reunite points of view that otherwise are separated one from another.

If it is considered that (1) mental illness is related to learning and (2) learning happens in a relational context between the subject and their environment, it can be assumed that a change in the context could mean changes in the subject's health. Therefore, an approximation to the concept of "cure"[2] may include the idea of building and reforming a habit and an ambit of thought (a pattern of learned behaviour that could be transferred to another space which in turn can be influenced or not by the context involved); this can affect the person's quality of life. In this paper it is assumed, as a hypothesis, that by modifying a habit of thought, the individual can change their situation and this can mean an improvement in their relationships with the environment, which tends to re-equilibration and, in turn, benefits the subject's health. In this work it is developed this hypothesis and showed empiric evidence that supports this assumption.

MATERIALS AND METHODS

A mixed methodological approach was applied to develop the paper: the main method was the argumentation and the second one, which takes the form of a quasi-experimental design, was nested into the first one as a strategy to present and support the main hypothesis. First, it was developed a theoretical hypothesis based on bibliographical analysis and synthesis, using the argumentation as the main method.

Secondly, the hypothesis was illustrated with an empirical case that follows a quasi-experimental design with a convenience sample of five male, middle-aged inpatients with Wernicke-Korsakoff's Syndrome who showed anterograde amnesia (sometimes retrograde too) and executive problems. The instrument was a commercial version of the Tower of Hanoi and it was developed a sequential procedure to probe the participants' learning.

The learning procedure follows the dynamic assessment principles (cfr. Bacigalupe et al., 2011) in a quasi-experimental setting with pre and post-tests, considering the individual as his own control. The pre-test consisted of a single application of the Tower of Hanoi with 5 rings with no other assistance that the explanation of the rules to follow (to move one ring per time and never put one bigger ring upon a smaller one) and the final objective (to form the pile in the opposite axis from departure, with the biggest ring on the base and the smallest ring on the top). The post-test consisted of a single application of the Tower of Hanoi with minor assistance from the examiner (a second trial during the same session was allowed if necessary); this time the number of rings varied according to the best performance achieved by the participant during the training period, from 2 to 5 rings. The training period consisted of ten sessions of teaching-learning in which the examiner (MAB) assisted the participants, helped them to remember the rules and final objective, and served them as an "external frontal lobe" to control their automatic behaviour. More detailed explanation of procedures can be found in the open-access journal paper by Bacigalupe et al. (2013). Ethical norms were

[1] What we before thought of as illness or pathology or social deviation are, indeed, new properties that human beings acquire when they change their equilibrium condition. These forms which we could understand as new properties are stabilized as pathologies in which the system, the complete individual is subjected to hard environmental constraints (such as relational, familiar, school constraints).

[2] It is relevant to make it clear that this paper presents an anthropological-educational perspective as a contribution to an integral and interdisciplinary view of mental illness but that the authors are not able to write as if they had the specific knowledge of medicine; therefore in this paper the word "cure" is written between quotation marks.

followed on conducting the research (Universal Declaration on Bioethics and Human Rights, 33rd UNESCO's General Conference, 2005; Helsinki Declaration, 18th World Medical Assembly, Finland, 1964 and its amendments).

RESULTS AND DISCUSSION

Learning contexts, cognition and problem solving

In this work it is assumed that there exists five learning contexts which are classified into two sub-groups: positive learning (learning to do), and negative learning (learning to inhibit actions). Two kinds of stimuli are present in both of them: conditioned and unconditioned stimuli. The five learning contexts are: (a) problem solving, (b) pavlovian context, (c) instrumental reward, (d) instrumental avoiding, and (e) serial or mnemonic context.

Learning contexts gradually build habits of thought which, once formed, function as behavioural premises in the subject. Authors of this paper assume that habits of thought depend on the contexts and stimuli, and changing any of them, habits can acquire new forms and, eventually, become flexible.

Proto-learning and *deutero-learning* are two kinds of learning gradients. *Proto-learning* or first-order learning (Bateson, 1972/1998) refers to classic and instrumental conditioning, and mnemonic learning. *Zero-learning* (the reception of signals or external information) is a kind of learning which precedes *proto-learning*. Finally, *deutero-learning* or second-order learning is a kind of learning which arises as a proto-learning gradient when it is applied some repetition or practice on the same topic, as a result of which the execution time or the quantity of mistakes improve progressively. In this way, people can develop patterns of behaviour which can be transferred to other contexts. In this case, *deutero-learning* can be a kind of *learning to learn*. At this point it is relevant to state what is the meaning of *cognition* from the point of view of the authors of this paper. Héctor (Lahitte and Hurrell, 1995; Lahitte and Ortiz Oria, 2005) points out that the aim of the anthropologists who work on cognitive anthropology is the recognition of the observation points from which the *ens universale* is configured and expressed in each society, which results in a cognitive style (Maruyama, 1980; 1992), a general vision shared by every member of that society. The term *cognition* names such questions: in a figurative sense *cognition* means what is configured, what is built.

The term *cognition* involves some kind of internal representation of the external world and the organization of sensory information in internal models. Depending on the circumstances in which it is expected to find it, *cognition* can be understood as adaptation, and it neither makes sense in contexts of maximum variability (having an internal map does not make sense if the territory is constantly changing) nor in zero variability contexts (cfr. Lahitte et al., 2006). The function of cognitive brain mechanisms permits predictive processing, understood as any type of processing which generates not only information about the past or the present, but also future states of the body or the environment; in this sense, predictive processing helps to generate goal-directed and adapted behaviour (Bubic et al., 2010).

What is characteristic of human cognition according to Tomasello (2000) is the possibility that human beings have to aggregate cognitive resources in a truly original manner. The author distinguishes human cultural learning from other kinds of social learning and includes within the first learning by imitation, learning by instruction and collaborative learning. These three kinds of cultural learning are possible thanks to a particular form of social cognition, which is the ability of human beings to understand their conspecifics as themselves, with an intentionality and mental life like their own. This understanding makes people able to put themselves in the place of others "so that they can learn not just *from* the other but *through* the other" (Tomasello, 2000: 6)[3].

Specifically, human cognition, according to Tomasello (2000), is the result of a kind of species-specific cultural transmission. Traditions and artefacts incorporate modifications in the course of time with a *ratchet effect* by which some processes cannot go back once they have happened. The process of cultural accumulation requires not only the creative invention but also, and fundamentally, faithful social transmission which works as a ratchet to avoid regressions and losses. In this way, a new practice or artefact faithfully preserves its characteristics until a further modification or improvement occurs which will be learned by others, preserved and eventually modified and the whole process will be repeated. The dynamics of the instruction-learning linkage allows to conceive *cognition* not merely centered in the individual but as the result of a relationship.

These assumptions about *cognition* imply that learning processes are not necessarily *placed* in the brain, but that *cognition* is an extended process (Broncano, 2007; Clark, 1999; 2004; Clark and Chalmers, 1998; Sprevak, 2020). The authors of this paper think that learning happens in the individual-context interaction and the environment where this relationship takes place can be called learning context. Among the above mentioned learning contexts, the problem solving environment brings into play the concept of transference. Transference is defined as the ability to expand what has been learnt in a given context to new contexts (Bransford et al., 2002; UNESCO, 2013), thus gaining access to an ample group of purposes and intentions.

In this paper, it is made a distinction between (a) simple, automatic procedures in exercises, and (b) strategic procedures of problem solving, which constitute one variety of *deutero-learning*. The first step in procedural learning is occupied by the techniques and

[3] Italics are from the original text

sequences of actions developed routinely (Pozo, 2000). These are not single habits learned implicitly by reinforcement or by exposure to a model, but are composed by sequences of actions learned by repetition and by explicit, associative training until they become automatic procedures. Techniques are useful to cope with exercises. However, when there is variation in any part of the situation of an exercise, it becomes a problem because the sequential repetition of the steps learned is not enough to get a solution and the subject requires to develop a strategy. This is the second step in procedural learning and consists in the utilization of techniques in new or complex situations in which techniques must be adapted to specific demands. The acquisition of strategies requires constructive learning more than associative learning. In this process, people develop reflection on their own practice, and re-elaborate their actions according to self-assessment. One particular type of strategy is learning to learn and self-monitor of one's own learning, which implies learning to use reflection about one's own knowledge, also known as *metacognition*. The higher level of procedural learning is *learning to learn*, and problem solving, which is supported by working memory processes (Gray et al., 2003; Lezak, 1995; Thompson, 1993).

The concept of cognitive flexibility is the key factor for the distinction between solving a simple exercise or problem, and solving a problem, and can be illustrated by novices and experts' performances. The difference between merely skilled and highly competent people can be observed in a variety of fields of knowledge and implies a kind of flexible expertise. The concept of *adaptive expertise* (cfr. Bransford et al., 2002) provides an important learning model. Adaptive experts are able to approach new situation flexibly and can learn along their whole lives. They not only use what they have learnt but also develop their *metacognition* and permanently question their expertise level in order to surpass themselves.

The concept of *metacognition,* which characterises adaptive expertise, was originally introduced in the context of children studies and refers to the ability to self-monitor their present comprehension level and to decide when it is not adequate (Bransford et al., 2002). Daily problem solving involves cognitive processes related to the access and manipulation of previous knowledge which is relevant to a present problem, the generation of appropriate strategies, the inhibition of inappropriate or routine responses which are not applicable and the ability to judge the efficiency of the solution. Furthermore, daily problem solving involves emotional and social abilities. These daily problems share some properties with neuropsychological or structured problem solving tasks applied in laboratories, in which the sequence can be characterized by recognition, difference-distinction, and type. However, daily problems differ from laboratory ones in that they present a less defined structure, they may have an open and relative end, there exist competing properties depending on the context, and it is necessary to include the point of view of others and to have an adequate social-contextual knowledge. Furthermore, the potential consequences of solution alternatives should be examined and pondered (Channon, 2004).

Cerebral fontal dysfunction can be associated with difficulties in different aspects of problem solving including working memory; for example, a decrement in the efficiency of using previous knowledge can be observed as a result of a memory deficit in the generation of search strategies (Channon, 2004). Behavioural disturbances associated with frontal lobe lesion can be summarised as follows (Baddeley, 1999; Lezak, 1995): 1. Initiation problems: a decrement in the rate of behaviour emission and a decrement or complete loss of initiative, a loss of spontaneity and productivity, and, sometimes, apathy, muteness or the absence of response (with respect to some reference from the observer); 2. Perseveration and difficulties in making mental or behavioural shifts; 3. Trouble finishing: loss of control, impulsivity, over-reactivity, disinhibition and difficulties to avoid wrong, unwanted answers, particularly if they are part of a current chain response; 4. Deficit in self-consciousness: deficit in self-criticism, inability to see execution mistakes, to appreciate the impact of the self on others and adequately evaluate a social situation; the sense of the self seems to be very vulnerable in people with frontal lesions; and 5. Concreteness: incapacity to dissociate themselves from the immediate context, in which objects, experiences and behaviours are understood from their most obvious aspect, resulting in an incapacity to plan and sustain a behaviour driven by objectives. Although many of these patients show an inability to manipulate abstract concepts and can only generate concrete concepts spontaneously, others preserve a high degree of conceptual abilities in spite of their loss of perspective and literal consideration (Lezak, 1995).

Problem solving in a mnemonic learning context with people with amnesic and executive deficits: A possibility

Tower tasks involve problem solving functions and transference in which the examinee must rearrange some discs or little balls by a minimal number of movements in order to make them match the model or reach the established final objective.

Developed on the basis of Simon's model of the Tower of Hanoi, tower tasks help to assess executive functions and problem solving. It is agreed that they primarily involve planning (Anderson and Douglass, 2001; Lezak, 1995; Newman et al., 2003; Riccio et al., 2004; Spreen and Strauss, 1998): if people plan movements and visualise solutions in advance it is supposed that they

would be involved in the development of a more efficient problem solving strategy.

Tower tasks have rules to follow to reach the final solution: they vary in the successive versions and have different structures and ways of assessing execution (Riccio et al., 2004). The process of solution of tower tasks synthesises two models about executive functions (Newman et al., 2003)[4]: Shallice's information-processing model, published in 1982 (Shallice, 1982; Baddeley, 1999; Newman et al., 2003), and Newell's model which was published in 1990 (Newman et al., 2003).

According to the first model, there are two cognitive control paths in executive functions: (a) routine-like, bottom-up and perceptually driven and (b) strategic, top-down and driven by objectives.

On the other hand, Newell's theory poses that problem solving involves a sequence of cycles of four stages each: (a) deliberation, in which all the alternative operators are considered in parallel, (b) parallel computation of preferences between pairs of operators, which Lahitte (1981) calls learning in increasing complexity, where each preference refers to the fact that one operator is preferable to another, (c) decision making by organising preferences to select the best operator, and (d) application of the selected operator to the current state so as to produce a new state. However, if any one of the preconditions to apply the operator is not satisfied, it will be necessary to put forward sub-objectives to reach the preconditions before applying the selected operator in this fourth phase.

The two models, Shallice's and Newell's theories, work together because while the ordinary approach to solve the tower is guided perceptually by proposing operators which enhance visual similitude, trying to reduce the range between the initial state and the goal state (without taking into account whether preconditions are achieved), the strategic, non routine approach takes control when these conditions are not met, thus creating sub-objectives to satisfy preconditions (although they can enlarge the perceptual distance between the initial and the final state of the tower). Once the preconditions are satisfied, the perceptual mode regains control to apply the original perceptual operator.

It has been shown that thinking aloud can help solve the tower. Instead of representing a mere verbalisation, thinking aloud might be some form of metacognition resulting in an incremented effort to produce a self-explanation of the process to reach the solution (Noyes and Garland, 2003). This could be illustrated in the following example with the Tower of Hanoi (see below for details of our research). The patient can use the technique of thinking aloud without metacognition (mere verbalisation) if they say "this ring here, the other there" and "the little ring on the bigger one" but their action is dissociated from what he/she is saying and this is mere verbalisation, which does not guide his/her actions but is independent and not coordinated with the procedure. Instead, if the patient's words help him/her to understand that he/she is making a wrong movement and thanks to this comprehension he/she can change the strategy on the spot, he/she is using thinking aloud as a metacognitive technique.

Considering the depicted conditions in tower tasks, it would be supposed that patients with anterograde amnesia (sometimes retrograde too) and executive problems such as people with Korsakoff's syndrome should not be able to learn to solve the task in a mnemonic learning context (*proto-learning*) and even less by the highest level of *deutero-learning*. The participants were Wernicke-Korsakoff's syndrome patients learning to solve the Tower of Hanoi (Anderson, 1995; Anderson and Douglass, 2001; Lezak, 1995; Spreen and Strauss, 1998).

One of the most important characteristic of problem solving tasks is the search of a sequence of steps that allows solvers to pass from the current state to the target one (Anderson, 1995), in which planning is the main process. The Tower of Hanoi is useful to measure the individual's planning during a problem solving process in which they face a platform with three axes (A, B, and C) and a number of rings which differ in their diameter piled from the biggest (at the bottom of the axis A) to the smallest (at the top of the same axis). The problem is how to form the same pile in axe C, taking into account that the rings must move from one to the other axis of the game with certain conditions (for example, it is not possible to leave a ring on the table or hold it while another is being moved). This is done by following two rules: (a) to move the rings one by one and (b) never to arrange a bigger ring on a smaller one. The Tower of Hanoi has been applied during four repeating sessions with an interval of one to seven days between sessions (Spreen and Strauss, 1998), which allowed researchers to observe several issues such as the development of a planning strategy, the long term storage of successes and failures during the resolution, and the benefit the patient takes from their own experience, among other relevant aspects. This model of tower tasks has been applied as a problem solving and executive functions test (Numminen et al., 2001).

In the research showed here it was used a commercial version of the Tower of Hanoi. It was supposed that the participants who worked with the Tower along the training sessions would be able to solve increasingly complex instances with adequate pedagogical support. It is understand here that adequate pedagogical support should be a kind of teaching which (a) works according to cognitive neuroscience and the relational framework of anthropology, (b) respects diversity, and (c) generates effective didactic tools. The level of complexity is defined as the quantity of rings each subject was working with, for example if the patient was working with five rings the

[4] Even though Newman et al. refer specifically to the Tower of London, we consider that their hypothesis can be expanded to similar tower tasks like the Tower of Hanoi

level of complexity was considered to be five. Two crucial issues in our research were: 1. The possibility to learn to solve the task (independently from the quantity of movements and the time consumed in the task), and 2. The quantity of movements of the execution: it was supposed that fewer movements and a successful execution mean a higher efficacy of execution.

Results from our research showed that during the pre-test the patients were incapable to solve the tower with a five-ring complexity. Pre-test consisted in a single session of traditional assessment, in which the role of the examiner (MAB) was limited to explaining to the patients the rules and the task objective with no other kind of intervention but the observation of the patients' behaviour. This mnemonic learning context can be called "traditional context".

During the training sessions the same examiner worked with the patients following the precepts of dynamic assessment (Bacigalupe et al., 2011), beginning the practise with a minimal number of rings and progressively increasing the level of complexity by adding more rings according to the particularities of each patient's performance. This increment in complexity was carried out with adequate guidance and intervention from the examiner. It is possible to call this learning context "dynamic context". Along the sessions the patients were able to improve not only the level of complexity and completeness of the task but also their self-monitoring. The post-test consisted in a similar session to the pre-test in a traditional context but each patient was asked to solve the tower with the level of complexity that they had reached during the training. This means that if they had solved the tower successfully with three rings and not with four or five rings, the post-test consisted in solving the tower with three rings. It is noteworthy to observe the particular way each patient was achieving task goals, with an own rhythm and idiosyncratic style of learning. While their learning progressed, each participant was developing a new relationship with his environment (the material and the examiner), a co-constructing relationship in which each one, the environment and the patient, modified each other.

Patient 1 was able to achieve the optimal solution of the task with two rings independently, which was an important learning result considering their constant impulsivity, easily fatigue, and permanent lack of confidence in his possibility of progress, apart from his executive dysfunction. During the training sessions he was able to recognize the times he was breaking the rules and he achieved the task with five rings but with the permanent assistance of the examiner.

Patient 2 achieved the optimal solution without any prompting from the examiner with two rings, and with the assistance of the examiner he was able to improve his execution with more rings including the five ones. Sometimes his language was dissociated from his action, showing dysexecutive problems. During the sessions he could improve his memory of the rules and kept the objective in mind. His self-regulation and persistence in action achievement were improved from the first sessions to the post-test.

Patient 3 got the 4 rings level independently in the post-test. During the training the patient showed that the use of verbalization helped the direction of his action; besides, he achieved the level of five rings with the assistance of the examiner. From a behaviour characterized by the persistence in violating the rules in the pre-test, the patient was getting control on his action and self-regulation through the sessions, remembering the objective and the rules to follow.

Patient 4 showed a particular performance characterized by impulsivity and concrete thinking, and a relative rejection to be prompted by the examiner; therefore the assistance was rather cautious and takes more the form of following his line of thinking that openly helps him to change it. Even so, he was able to optimally solve the tower with 2 rings the first training day, and continue improving his performance but with an excessive number of movements and committing lots of mistakes. The post-test showed a complete absence of recognition of having worked with the tower before and no memory of the rules; but, once the rules were repeated, his performance showed learning: he achieved the 5 ring level but with some mistakes that required some external help and lots of unnecessary movements to get the final solution.

The performance of the patient 5 in the pre-test was similar to the rest of the participants, with no possibilities to think in a valid strategy to solve the problem and difficulties to retain the rules and the objective. During the training the patient was able to make a significative progress from the 2 rings difficulty to the 5 rings solution and got a progressive self-regulation in following the rules and achieving the objective. The post-test showed a stunning response solving the 5 rings difficulty of the task in the second chance without help nor errors; and he was able to get a kind of learning transference through solving the tower in an inverse direction. He showed a capability of *deutero-learning*, mental flexibility and learning from his own experience.

In comparison, while patients 3, 4 and 5 were able to learn the task with a 5 rings complexity, patient 2 achieved the 5 rings level with much more difficulties and patient 1 got a minor level of complexity of the task. Besides, the participants who achieved the 5 rings level of complexity of the task showed interindividual differences, showing that patient 4 was the less efficient (more movements to solve the same complexity level); the performance of the patient 5 was the most successful because he was able to solve the maximum level of difficulty with total independence of the examiner help and was able to transfer his learning by solving the tower in an inverse form.

The results allow to conclude that the participants not

only learned the task (*proto-learning*) but also improved their execution with practise and training (*deutero-learning*) and reached some level of flexibility and metacognition, which was different from patient to patient. It is suggested here that this behavioural change depended, at least in part, on the context (the "dynamic context") created by the examiner-participant relationship, the way the examiner prompted their execution and the way they interacted to direct the participant action.

Conclusions

Understanding cognition as extended or mediated means is adopting a fundamental methodological and epistemological decision. This not only implies consequences in the philosophical postures about the mind and research in cognitive sciences but also has social and ethical derivations.

In the field of education one of the consequences of this perspective is found in the role of educators as learning mediators or vygotskyan scaffolds, working on the learner's zone of proximal development and promoting an active inclusion of people in their culture. Another consequence of this perspective can be found in medical sciences, in which a systemic point of view can consider that people are not ill *per se* but they are ill only in relation to an environment which surrounds and conditions them. This means that the concept of health and illness depend on a given cultural perspective. Therefore, medical sciences are interested not only in the patients but also in their environment, and look into the social and physical factors which can influence the loss of the balance that frequently defines the term health.

Delineating an idea of "mental health" requires two explanations: 1. To understand the system as healthy or ill, according to the diagnostic criteria of "normality" and "abnormality", and 2. The researcher should accept that the criteria of "normality" and "abnormality" are closely related to a consensus on acceptance and rejection of certain behaviours, which arise from a co-existence of consensual coordination.

This means that "the idea of mental health" is conceivable only in the ambit of the social dynamics which delineate it. In other words, this idea depends on the subject or participants who experience it and the context of recurrent emotional contradictions. This form of learning and showing emotions is what finally can or cannot make people ill.

Attempting to link learning and "cure", and attempting to understand whether a cognitive system works adequately implies understanding when and how somebody's behaviour becomes part of a world of meaning which is pre-existent or new and consensual. It is relevant to this perspective to point out that representations no longer have a central role that "intelligence" is no longer responsible for solving a problem or manipulating several material resources, even though it is the capacity to enter a shared world. This means that the idea of this paper is beyond the measurement of the benefit of changes in the scale and time of the performance in the resolution of specific tasks. The authors' point of view goes beyond in the same direction but comprising the temporality of living in a shared world from where the social phenomenon emerges. The goal is to find an endogenous activity which matches with the optimal codification of the environmental regularity; in short, to find a cognitive system in which the endogenous and exogenous phenomena are defined by a viable link.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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