

Neuroscience for Human Resources Management: A Literature Review

Les Neurosciences Au Service Du Management Des Ressources Humaines: Revue De Litterature

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Abstract: With the acceleration of communication and the urgency of the environment, the complexity lies in knowing how the human being functions. In fact, the proper use of the brain is the greatest lever of human development. Using our brain's potential wisely is a key factor in our success, as it guarantees well-being, boosts motivation and consequently improves performance. Today's knowledge of the brain offers unprecedented hope for our increasingly interdependent societies. In this research project, we will be shedding light on the contributions of neuroscience, explaining all the underlying mechanisms that condition human behavior. We feel it is important to define the concept, and to address the tools and practices of Neuromanagement that are profitable for the company.

Keywords: Human brain, Human resources, Human resources management, Neuromanagement, Neuroscience

Résumé: L'accélération des moyens de communication et l'urgence environnementale, la complexité est de savoir comment fonctionne l'être humain, en effet le bon usage du cerveau est le plus grand levier du développement humain. L'utilisation à bon escient de nos potentialités cérébrales est un facteur clé de succès de notre réussite dans la mesure où elle permet de garantir le bien être, booster la motivation et par conséquent améliorer la performance. Les connaissances actuelles en matière cérébrale soulèvent un espoir providentiel sans précédents pour nos sociétés de plus en plus interdépendantes. Dans ce travail de recherche nous mettrons la lumière sur les apports des neurosciences, il s'agit ici d'expliquer tous les mécanismes sous-jacents qui conditionnent les comportements humains, il nous est apparu important de définir le concept, d'aborder les outils et les pratiques du Neuromanagement qui sont rentables pour l'entreprise.

Mots clés: Cerveau humain, Management des ressources humaines, Neuromanagement, Neurosciences, Ressources humaines,

I. Introduction

In an unfavorable, toxic working environment, our professional lives would be filled with stress and unhappiness. Thinking seriously about new practices to build a new company is the only way to happiness. All it takes to make a company work is to give more importance and value to people. Nelson Mandela had a saying: "If you want to change the world, change education". As a researcher, I'd like to transpose the same idea, but this time to management within the company: "If you want to change the company, change the way people are managed, by giving more value to the human being".

The neurosciences have recently made considerable progress, enabling us to completely revise our understanding of human functioning. This has created a revolution in the human and social sciences, from education to marketing to management, giving rise to new names and concepts that have been rapidly adopted by those who hear them (Neuromanagement, Neuromarketing, Neuroeconomics, Neuropedagogy, Neurocoaching). If human resources management is to retain its place in the humanities and social sciences, it must take advantage of neuroscientific contributions. Neuroscience applied to management can only be of greater interest, insofar as it sheds new light on the way we function, and is useful for the well-being, motivation, decision-making and performance of human resources within the company. Science is bringing us new techniques for awareness and personal and professional development.

The temptation to revisit human resources management by drawing on neuroscience is not a magic wand for transforming oneself, others and the company, but it is a combination of skills and good practices likely to modify our vision and go beyond the limits of traditional human resources management, and even keep up to

date in a changing environment and a world characterized by the amount of scientific research growing exponentially day by day. The idea of taking advantage of neuroscientific contributions therefore seemed a natural one, and this has given rise to a new area of HRM that merges neuroscience and management, opening the door to a new world of knowledge that is nothing less than Neuromanagement. The aim of this research project is to shed light on the contributions of neuroscience to human resources management through a literature review. More specifically, our work addresses the following question: Do the contributions of neuroscience really enable us to modify our vision of human resources management?

In order to answer this question, we will review some of the neuroscientific contributions that shed important light on how we function, and bring a fresh perspective to human resources management.

II. Neuroscience: Definition and Evolution of the Concept

Neuroscience is one of today's great discoveries, providing us with an unprecedented volume of information on how we function, and its influence is far-reaching, whether in our personal or professional lives. Exploiting its contributions in the workplace will enable us to change our vision and reframe our relationships with others.

Neuroscience is one of the cognitive sciences that has seen real progress over the last two decades. The word neuroscience is recent, dating back to the 70s. It refers to the scientific study of the nervous system and brain function, from the molecular to the behavioral level. Neuroscience enables us to gain a better understanding of how humans function and behave, and to make the link between decision-making and its applications, between an individual's motivations and his or her actions.

Neuroanatomy began to treat the brain in the mid-19th century with staining techniques, viewing it as a material object made up of molecules, cells and circuits. The functioning of the brain was also studied by neurology, by neurophysiology (electrical recording techniques) in the 20th century, and by brain imaging in the 1980s.

In the mid-50s, the Walter Reed Army Institute of Research was set up to simultaneously study the psychiatric and neuroanatomical aspects of veterans. In 1967, the first department of neurobiology at Harvard was founded by Stephen Kuffler. Neuroscience societies then appeared in the USA, France and Europe in 1968, 1978 and 1988 successively. From the 1980s onwards, a new branch of neuroscience emerged, bringing together neuroscience and psychology under the impetus of Michael Gazzaniga and Patricia Goldman-Rakic.

Since the 50s, there has been a progressive integration of different disciplines: neuroanatomy, neurophysiology, neuropathology, neurobiochemistry, neuropharmacology. Then, between the 60s and 80s, molecular biology and genetics were integrated, interacting with neurology and psychiatry. Between the 80s and the present day, we have seen the advent of brain modeling and imaging.⁽¹⁾

It was this collaboration between neurologists, neuropsychiatrists, psychologists and biologists that gave birth to neuroscience. Its scope of application is vast, which is a real factor in the advancement of scientific research.

Ilardi and Feldman (2001) point out that neuroscience is based on four fundamental concepts:

- ✓ Our brains and the cognition associated with them are the product of a very long phylogenetic evolution; human cognitive functions and abilities can only be fully understood in an evolutionary context.
- ✓ There is an identity between psychic events and neuronal events; consciousness emerges from a complex process of interactions between the brain and the rest of the body, whose states are represented neurally.
- ✓ All explicit human behavior is the result of intentionality, generated in the central nervous system: there is no "mental causality" as an ultimate antecedent.
- ✓ Genes seem to offer certain predispositions, albeit conditioned by the occurrence of environmental factors. Nature and nurture are thus less antagonistic than previously assumed (Feltz, 2000).⁽²⁾

Neuroscience facilitates learning insofar as it ensures that what is learned is better remembered in terms of know-how, as it is based on how the brain works, Ruth Stuart points out. "Understanding how we actually learn enables companies to deliver more targeted training, in less time and at lower cost". Neuroscience therefore provides us with the benchmarks we need to better understand the scope of our intuitions and

⁽¹⁾Imbert, M. (2006) *Traité du cerveau*. Odile Jacob

⁽²⁾ILARDI S. et FELDMAN D. (2001), "The Cognitive Neuroscience Paradigm, a Unifying Metatheoretical Framework for the Science and Practice of Clinical Psychology", *Journal of Clinical Psychology*, Vol. 57, No. 9, p.1067-1088.

emotions, and gives corporate players the relevant weapons they need to effectively manage human resources, by moving towards a new mode of HRM, which is Neuromanagement.

It's a new management approach designed to shed light on how people function and behave in different work situations, and how to encourage them to live their professional lives to the full. To achieve this, knowledge, if not mastery, of the new neuroscientific study techniques appears necessary, insofar as they bring and will bring new, richer and more solidly established perspectives. They enable us to pre-test and validate good management practices. This, of course, contributes to the advancement of human resources management, while providing clear-cut answers to questions that have long been of concern to managers and HR directors alike.

As a result, the use of Neuromanagement in today's business environment is becoming increasingly necessary, given its growing influence not only on individual, collective and organizational performance, but also as a remedy for management problems encountered within the company. This approach has been developed since 1987 by Jacques Fradin and a group of French researchers at the Institut de Médecine Environnementale (IME). It is not a therapy, but rather an approach whose effectiveness has been scientifically validated: "Its aim is neither to replace nor to be close to psychoanalysis. The aim is to help managers understand emotions, intentions and basic behavioral changes, based on neuroscience". Chantal Vander Vorst (2013).

Human resources management, like other fields, therefore needs neuroscience to overcome the obstacles and limitations of conventional management, significantly improve motivation and boost performance. The idea is to neuromanage without turning the company into a therapy center.

Neuroscientist Robert Ornstein declared in a 1975 radio broadcast on "Psychology Today" that "For the love of humanity I would really like the product of the last fifty years of psychological research to be studied by everyone, so that these discoveries become part of their way of thinking. At the moment, people have only adopted a few of them. They routinely talk about Freudian slips of the tongue, and they've accepted the idea of the inferiority complex. But they have this large body of psychological information and they refuse to use it" (IDRISS ABERKANE, 2016).

Decision neuroscience (Shiv et al., 2005) is one of the main themes of cognitive neuroscience. It aims to explain the decision-making process in situations of uncertainty and risk. Researchers have studied the neural substrates of economic concepts, such as the expected utility of a good (Padoa-Schioppa and Assad, 2006), which guide the nature of choice (Preuschoff et al., 2006). Others have shown that the outcome of a mental deliberation and the choice to make a particular decision is based on a subtle imbalance between two cortical structures, one encoding the appetite of the utility evaluated (reward circuit), the other encoding the aversive level of the consequences linked to a possible bad decision. Greater activation of one than the other predicts the individual's final decision (Knutson et al., 2007).

What neurosciences have given us today about how we function should be the benchmarks for building an organization adapted to human beings, where well-being and performance go hand in hand. For the company to be transformed and our working lives to be healthy, we need to use our brains ergonomically, which is what we call neuroergonomics. ⁽³⁾ "Doing neuroergonomics means changing the world, brain by brain, and changing the destiny of humanity. To do neuroergonomics is to liberate people's mental lives". ⁽⁴⁾, is exactly what we really need today to live our personal and professional lives to the full.

Neuroscience sheds light on the substrates and foundations of human behavior in the organization: "The science of the brain, in its relations with behavior and mental life, [...] is penetrating deeply into the field of human and social sciences" (Jeannerod, 2002).

Today, we can't ignore certain neuroscientific contributions that are renewing the way we do things at work, and providing scientifically testable explanations of how we function.

III. The Contribution of Neuroscience to Human Resources Management

1. The human brain, a marvellous resource

The human brain contains 100 billion neurons, each of which can establish up to 100,000 connections with other neurons. Its mode of operation and energy consumption change according to the task at hand, but as long as we're alive, it's active, offering an astonishing range of possibilities for action and reflection that should help us build our lives and our happiness.

⁽³⁾ L'art de bien utiliser le cerveau

⁽⁴⁾ Aberkane, I. (2016). Libérez votre cerveau!: traité de neurosagesse pour changer l'école et la société. Robert Laffont, p.18

But, alas, mankind doesn't make sufficient use of this fabulous resource, and it's not clear that it has enormous potential. It's hard for us to appreciate what we can do, and to use the full potential of our brain, which is an infinitely precious resource within us.

In the workplace, some people fail at a given task not because they don't have the knowledge to do it, but because they don't want to or don't know how to use the knowledge available. It's a problem of awareness: we don't know that we know everything we know. "Knowing that we know is costly for our brain, and this cost is reduced in particular by the filter of the frontal cortex which, before consciously carrying out each task, establishes a more or less reliable model of our ability to perform it. It often seems to whisper to us: "Are you sure you can do that? But metacognition isn't just about "knowing that you know", it's also about "knowing how you know" and "knowing why you know". Why do we know? What? Why know? Where? When? These, among others, are the "metadata" of our knowledge, just like the metadata on a digital photograph, which indicates where, when and how the shot was taken. One reason why knowledge is not always provided with such data is to avoid overheating our cognitive system, which must constantly sort out what is essential and what is not".⁽⁵⁾

We know how to walk, run, breathe, talk and think, but we don't know how. That's because we're unaware of our innermost workings: our behaviours, our emotions and so on. Awareness of our nervous processes is a great effort. Awareness of this very conquest is the foundation of neuro-knowledge. According to Socrates, self-knowledge is a necessary prerequisite to knowledge of the universe: "Know thyself and thou shalt know the Universe", as confirmed by Stanford neuroscientist Robert Ornstein (IDRISS ABERKANE, 2016).

In our professional lives, we are called upon to manage a number of situations, whether it's a conversation with colleagues, making decisions, setting objectives, resolving a conflict, helping an employee in a difficult situation (lack of confidence, lack of productivity, absenteeism, etc.....), solving a problem with a customer, calming down an irate colleague. All these situations require knowledge and good use of our brain, a principle of neuroergonomics.

IDRISS ABERKANE, declared in 2016 that "We don't use our brains well. At school, at work, in politics, we don't use our brains ergonomically. The consequences of this misuse are diverse, but what they have in common is malaise, mental petrification and inefficiency. This is particularly true of our economy: its nervous correlates are far from optimal, and humanity's collective brain is confined because individual human brains are confined. Breaking out of this confinement is a necessity if we are to be happier and more fulfilled, and therefore more productive and efficient.

We all have the same brain to start with, but each of us has his or her own way of using it, which shows that there are creative and serene people and those who are not. The study of brain function is an innovative practice that aims to shed light on human behavior. At the end of the day, what's missing in the corporate world is the fact that human beings are no longer treated randomly. Knowing how people work, in the same way as budgeting and IT, can lead to greater well-being and performance.

Knowledge of the brain's organization, cognitive processes and the conditions of their modification is extremely useful for self-development, communicating well, taking care of oneself, and building and managing relationships with others, particularly in the workplace. Managers and HR directors are interested in neuroscientific contributions, to help people develop and succeed in their professional lives.

For a company to be sustainable and successful, the people who make it up are expected to solve complex problems, analyze situations and innovate, but they can't totally ignore their emotions. At the deepest level of our mental functioning, modes of reasoning and emotional reactions are intertwined, intimately linked (BERNADETTE LECERF-THOMAS, 2014). All human behaviors (actions, thoughts, emotions or decisions) have a common origin: the brain⁽⁶⁾. The latter perceives stimuli during our interaction with other people (Manager or others), processes them, stores them, and uses them for action. A better understanding of these mechanisms enables us to better manage them and adapt our behavior.

In our brains, we distinguish between two hemispheres that are identical, but do not have the same function. The right brain, known as the holistic brain, is the key to discovering new options. The left brain is responsible for storing knowledge⁽⁷⁾.

Creative people know how to use both hemispheres in a complementary way. We also differentiate between the automatic mind, which is responsible for 90% of our brain's decisions, and the adaptive mind, which is evolving (Jacques Fradin, 2008). According to neurosurgeon MC LEAN (1990), the brain is not just a

⁽⁵⁾Aberkane, I. (2016). *Libérez votre cerveau! : traité de neurosagesse pour changer l'école et la société*. Robert Laffont, p. 231.

⁽⁶⁾Collignon, P., & Vorst, C. (2013). *Le management toxique: Harcèlement, intolérances, missions impossibles... Comment s'en sortir?*. Editions Eyrolles.

⁽⁷⁾Goldberg, E. (2007). *Les prodiges du cerveau: ou comment l'esprit se bonifie avec l'âge*. Robert Laffont.

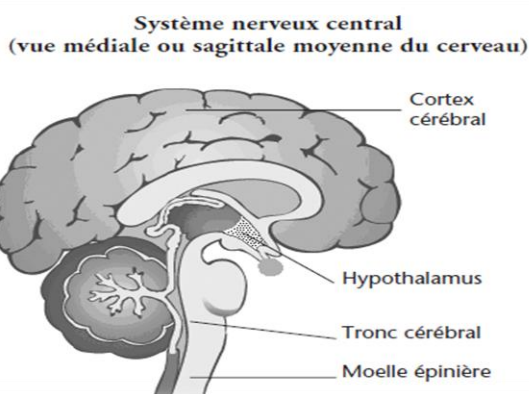
matter of right and left hemispheres. It's made up of three cerebral territories. Each plays a very important role. Our behavior and decisions depend on which area is active at any given time⁽⁸⁾. Neuromanagement enables us to understand them, reveal them and better manage them. They correspond to four very distinct missions: ⁽⁹⁾

- Ensuring individual survival
- Ensuring collective survival
- Structure personal motivation and social life
- Enabling adaptation and innovation in an uncertain environment.

✓ **The reptilian brain**

The reptilian brain, or primitive brain, is the lower part of the brain that ensures individual survival (basic physiological needs: drinking, eating, sleeping, reproducing), and is the starting point for vertical stress circuits. When the body detects a dangerous situation, the part of the brain responsible for protecting us (the hypothalamus, in particular, located in the so-called reptilian territories), sends out an alert message. It then ensures our body's vital functions by controlling heart rate, breathing, body temperature, balance, etc.⁽¹⁰⁾.

Figure 1 : Central nervous system



Source: FRADIN J., AALBERSE M., GASPAR L., LEFRANCOIS C. et LE MOULLEC F. (2008).
L'intelligence du stress, Paris, Eyrolles. P.12

This part of the brain initiates stress-related programs (instinctive states ⁽¹¹⁾ or States of Urgent Instinct): Flight, Struggle, Inhibition (Henri Laborit, 1981).

- **Flight:** The first stage of the stress rocket to ignite is Flight (Henri Laborit, 1981). We feel like fleeing, a state of anxiety, annoyance and anger that manifests itself bodily in tremors, an unstable voice, preemptive acceleration of heart rate and breathing to promote tissue oxygenation, muscular tension, increased tone in the legs to run better, difficulty concentrating. We have stage fright, a feeling of insecurity, we are anxious and tense.
- **Struggle:** this is a state of irritation and anger that arises when one is in a situation where running is forbidden, or the path is blocked, or one is unable to run fast enough. This is the second pre-programmed score available to the primitive hypothalamic system for dealing with danger. Instinctive fighting, as described by Gray⁽¹²⁾, "is not an offensive attitude like predation or dominance, which are underpinned by other brain structures".

⁽⁸⁾Cécile Schauer. (2014). « Du stress à la créativité, outil du neuromanagement et dynamique du changement ».

⁽⁹⁾Collignon, P., & Vorst, C. (2013). Le management toxique: Harcèlement, intolérances, missions impossibles... Comment s'en sortir?. Editions Eyrolles. P.43.

⁽¹⁰⁾MAZOUZ, M. (2012) « Les trois cerveaux du manager, entre réflexion, émotion et pulsion», gotomeeting by citrix.

⁽¹¹⁾Fradin, F. (2004). La Thérapie Neurocognitive et Comportementale (TNCC)-ex-Psychophysio-Analyse. Editions Publibook.

⁽¹²⁾Gray, J. A. (1987). The psychology of fear and stress (Vol. 5). CUP Archive.

This state manifests itself bodily in a fixed gaze, aggressive gestures, a loud voice, a tension lower than in Flight, a certain slowing of the heart and breathing, the secretion of adrenalin, pride and words that go beyond thought (Jacques Fradin, 2008). All this is caused by the discharge of adrenalin and cortisol (stress hormone).

- **Inhibition:** in this case, if we find ourselves unable to flee or fight, we fall into a state of despondency, discouragement, depression, feelings of inferiority, lack of self-confidence and weariness, which manifests itself bodily in a low voice, stifled breathing, a slow heartbeat, a drop in energy, a blockage in digestion, a need for sleep, crying. We see things pessimistically and devalue ourselves, seeking support and protection. Inhibition also serves, on a primitive social level, to submit to a dominant.

Stress can therefore be defined as "the irritation, the feeling of anxiety, and possibly the physical tension felt by the person who finds himself confronted with a mission which requires a level of autonomy which he does not have and which he considers to exceed his capacity to cope with it".⁽¹³⁾ It's an indicator of the presence of a problem or risk, and plays an essential role in management, as a cause of toxicity on the one hand, and as an indicator to speed up the process of taking a step back on the other (Patrick Collignon, Chantal Vander Vorst, 2013). There are two factors in stress: the stressor (the external threat), and stressability (the internal reaction to stress). It is therefore the product of the stressor and stressability (Jacques Fradin, 2003).

Stress = Stressor x Stressability = threat x internal reactions.

In fact, it's our thoughts, our cognitions, that trigger stress, and putting them back in order soothes it⁽¹⁴⁾. We don't all see events in the same way, we don't all stress under the same conditions, for the same reasons, or even in the same degree. This human and cognitive stress is therefore internal rather than external in origin⁽¹⁵⁾. However, stress is a manifestation of the reptilian structure, generated not only by cognitive incoherence, but also by the obstruction and repression of the most intelligent brain: the prefrontal neocortex⁽¹⁶⁾, This is what we call lobotomy (Jacques Fradin, 2008). Indeed, stress is a major indicator of internal conflict and incoherence, which can only be detected by the prefrontal neocortex⁽¹⁷⁾, which allows us to understand why things are happening, then we just have to resolve this stress. If, on the other hand, the old structures (reptilian brain) play the role of prefrontal spokesperson, they will be unable to detect errors and can only recite their refrain: flee/fight or inhibit

However, there are squalid, psychologically dirty, unhealthy and soulless workplaces (toxic management), which are conducive to depression, anxiety and stress in one of its forms. It is therefore important to be aware of the sources of occupational stress in the company, which can take a variety of forms: workload, working conditions, role conflict and ambiguity, career development, interpersonal relationships, aggressive behavior, and in particular conflict between work and other roles.

Stress exerts physiological, emotional and behavioral effects on individuals, it can generate serious damage:

- ✓ Burn-out;
- ✓ Loss of self-confidence;
- ✓ Loss of self-control;
- ✓ Victimization;
- ✓ Anger, anxiety;
- ✓ Depression, discouragement;
- ✓ Aggressiveness, dissatisfaction;
- ✓ Pessimism, passivity;
- ✓ Loss of initiative;
- ✓ Blood pressure problems (Hypertension/Hypotension);
- ✓ Lack or trouble sleeping;

⁽¹³⁾Jex, S. M. (1998). Stress and job performance: Theory, research, and implications for managerial practice. Sage Publications Ltd. P.1-8

⁽¹⁴⁾Aaron T. Beck. (1989). Cognitive Therapy and The Emotional Disorders, Penguin Books.

⁽¹⁵⁾Fradin, J. (2003). Gestion du stress et suivi nutritionnel. Médecine et nutrition, 39(1), 29-34.p. 29-33

⁽¹⁶⁾Le néocortex préfrontal fera l'objet du point N°3.

⁽¹⁷⁾Fradin, J., & Fradin, F. (2006). Personnalités et psycho physiopathologie: nouvelles hypothèses en thérapie neurocognitive et comportementale (TNCC). Editions Publibook.

- ✓ Cardiovascular diseases, cancer, allergies, spasms, bulimia, anorexia, asthma, etc....
- ✓ Weight loss;
- ✓ Cerebraldys functions.

There is a relationship between stress and productivity that takes the form of a bell curve: there is an optimum stress level for any given job, but if stress exceeds this level, productivity and performance begin to deteriorate (Jex, S.M, 1998), always reflected in high emotional reactivity. According to Jacques Fradin (2003), when a company is stressed, it quickly becomes anorexic. In this context, we can cite some of the organizational costs associated with stress-related illnesses:

- ✓ Reduced productivity and profitability;
- ✓ Demotivation;
- ✓ Employee is satisfaction;
- ✓ Limitation of intellectual potential and innovation;
- ✓ Increased absenteeism, aggressiveness, anxiety, depression and various pathological disorders;
- ✓ Conflict creation;
- ✓ Work-related accidents; caused by the worker's inability to cope with emotional problems aggravated by stress. (Don Hellriegel-John W. Slocum⁽¹⁸⁾, Jacques Fradin⁽¹⁹⁾).

Stress therefore poses a real problem, with repercussions on individual and corporate performance. Hence the need for practices that can help executives and managers manage the situations that are most explosive for the individual's brain. And thus penalize the well-being, cohesion and performance of their teams. Indeed, listening to EUI is an essential Neuromanagement practice. It is imperative for managers today to diagnose the three states of stress, so that they can manage people in difficult situations.

Patrick Collignon, Chantal Vander Vorst(2013), state that there are attitudes to adopt and others to avoid with a stressed employee, depending on the case:

❖ **On the run**

For adoption	To avoid
<ul style="list-style-type: none"> ✓ Reassurance ✓ Empower ✓ Explain and clarify ✓ Encourage autonomy ✓ Look for solutions, ask open-ended questions. ✓ Be empathetic, friendly and participative ✓ etc. 	<ul style="list-style-type: none"> ✓ Devaluing ✓ Disempower ✓ Criticize ✓ Judging ✓ Sanction ✓ Asking closed questions ✓ Moralize

❖ **In fighting condition**

For adoption	To avoid
<ul style="list-style-type: none"> ✓ Stay calm ✓ Active listening ✓ Understand ✓ Step back, frame ✓ Share responsibility for mistakes ✓ Explain the situation simply, directly, logically and concretely ✓ Ask the other person about the desired outcome ✓ Act and propose ✓ Nuance ✓ etc. 	<ul style="list-style-type: none"> ✓ Confront ✓ Reproach or criticize ✓ Oppose ✓ Ordering "calm down" ✓ Questioning intelligence and ability to act ✓ Compare ✓ Interrupt, threaten, lie ✓ Deny, console, infantilize ✓ Being unfair, hesitant, imprecise, slow, disorganized ✓ Fight

⁽¹⁸⁾ Don Hellriegel-John W. Slocum. (2006). Management des organisations, nouveau horizons.

⁽¹⁹⁾ Fradin, J., Aalberse, M., Lefrançois, C., Gaspar, L., & Le Moullec, F. (2011). L'intelligence du stress: Mieux vivre avec les neurosciences. Editions Eyrolles.

❖ In inhibition state	
For adoption	To avoid
✓ Support	✓ Degrade
✓ Enhance	✓ Devaluing
✓ Dialogue	✓ Victimization
✓ Ask for feedback	✓ Encourage willpower, courage
✓ Encourage and motivate	✓ Judging
✓ Be factual	✓ Shaking
✓ Empathize, listen and remain calm	✓ Forcing autonomous action
✓ Protect, support	
✓ Being present	
✓ Speak softly	
✓ Strengthen the bond, synchronize	

Knowledge of these states, of the attitudes to adopt and those to avoid, will enable us to better manage stressful situations, while placing fulfillment and well-being above all else. This is a principle of neuroergonomics, which increases our capacity for survival.

✓ **The limbic territory**

It ensures collective survival (i.e. the survival of the group to which we belong and, more broadly, of the species) and motivation. Also known as the "emotional brain", according to Antonio Damasio, this area is the seat of our emotions and motivations, and is located in the center of our brain. It is a collection of structures, including the amygdala, hippocampus, septum and basal ganglia, which contribute to emotional regulation.⁽²⁰⁾ This is the brain of competition, its function is sociability, affectivity and self-assertion, managing the known, the basic and the everyday. It memorizes pleasant and unpleasant behaviors. It is activated quickly and is not adapted to complex situations and novelty, so it is the heart of the automatic mental mode (AMM)⁽²¹⁾, that fixes learning. In our day-to-day lives, we can perform the tasks we often do without even thinking about them, so it's not surprising that they become automatic. Our brain prefers automatic thoughts and shortcuts, always looking for the easiest and least effort.

It's important to distinguish between the different types of motivation: primary or enduring motivation, which sees itself as a genuine source of fulfillment, and conditional or secondary motivation.⁽²²⁾

- **Primary motivations:** these so-called spontaneous and unconditional motivations remain stable throughout our lives. They are built up from an early age, and are what we do for pleasure, expressing our deepest nature, and are therefore linked to our fundamental values. They refer to the notion of pleasure in itself, and are not linked to any particular result, nor to the recognition of others.
- **Secondary motivators:** these are motivators acquired through education and the environment. These motivations are conditional, as they depend on extrinsic factors such as recognition, respect, acceptance, valorization, encouragement, results obtained, attainment of objectives, They may erode or disappear in the case of lack of respect and recognition, and may be reinforced in the opposite case. (Patrick Collignon, Chantal Vander Vorst, 2013).

✓ **The prefrontal territory or neocortex**

This area is located at the front of the frontal cortex, involved in planning and other higher cognitive functions, and is the most highly developed, intelligent and complex part of our brain. This territory enables us to deal calmly with new, unknown, complex, unexpected, uncertain and uncontrolled situations. It therefore generates responses adapted to novelty and complexity, and proposes solutions that are adjusted, nuanced, creative and innovative (Patrick Collignon, Chantal Vander Vorst, 2013). Creativity, adaptation and innovation in a complex environment is a key success factor, something that can only be ensured when the prefrontal cortex is fostered.

⁽²⁰⁾Organisation for Economic Co-operation and Development. (2007). Comprendre le cerveau: naissance d'une science de l'apprentissage. Organisation for Economic Cooperation and Development (OECD).

⁽²¹⁾Cécile Schauer. (2014). « Du stress à la créativité, outil du neuromanagement et dynamique du changement ».

⁽²²⁾Collignon, P., & Vorst, C. (2013). Le management toxique: Harcèlement, intolérances, missions impossibles... Comment s'en sortir?. Editions Eyrolles. P. 49-50-51.

Antonio Damasio⁽²³⁾, has stressed that the prefrontal is the only territory that is both: The meeting point of information of external origin; which informs us about the situation of the environment and its potentialities, and that of internal origin; about our biological state and our immediate needs and little or not conscious.

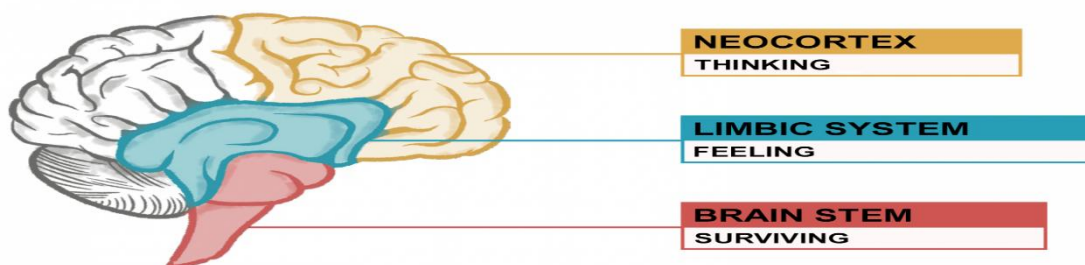
"This territory develops progressively and reaches full maturity around the age of twenty-five, which means that the other three systems manage most of the child's and adolescent's life. As a result, they constitute their habitual points of reference. »⁽²⁴⁾

In a given situation, considered complex or new, the prefrontal neocortex calls on its capacity for innovation, logic and openness, and calls on the resources of other brain areas to reconstitute a global vision of the situation, while accepting the dark areas, the element of uncertainty and making the right decision. It is also at the heart of emotional management and empathy.

Language, thought, imagination and consciousness develop in this territory. It is the activation of this territory that we call the adaptive or prefrontal mental mode (PMM). We can innovate by manipulating the services of our neurons, and create new, unexpected values that can change the world around us. This area of the brain is directly connected to all other brain structures⁽²⁵⁾ and knows what's going on in every part of the brain, since it has an anatomical network of direct wiring and connection with all parts.

The figure by (Mac LEAN, 1990) shows the three brain territories and their functions.

Figure 2 : The three brain territories



Source : Paul Mac LEAN Neurochirurgie, 1990

2. Mental Mode Management (MMM), a Neuromanagement tool

From the above, the human brain operates in two modes, an MMA and an MMP. Dealing with an unknown situation in instinctive mode causes the MMP to send an alarm signal (stress) to the conscious part of the brain. This stress invites us to take time to reflect, to put the situation into perspective, and thus to switch to the adaptive mode. Tassin (1998) speaks of a balance of power between the automatic mode (subcortical structures) and the prefrontal (cortical structures).

(Eysenck, 1982; Jamieson & Zanna, 1989; Svenson & Maule, 1993). Kruglanski and Freund (1983) show that stress levels have a significant impact on cognitive performance, while Radley et al. (2004, 2005) found in a rat experiment that when stress is significant, it induces abnormal changes in brain plasticity (significant dendrite growth in the amygdala). According to these authors, these cellular changes alter the capacity of the medial neocortex to inhibit the hypothalamic-adrenergic axis' response to stress. Arnsten et al (1998) have also suggested that stress rots the functions of the prefrontal cortex through a hyper-dopaminergic mechanism. For his part, Tassin (1998) noted the release of adrenaline in the prefrontal cortex in a stressful situation, which promotes subcortical dopaminergic activation (MMA) and blocks MMP. This hormonal discharge favors automatic rather than adaptive functioning, resulting in a repression of the prefrontal.

Thus, imaging studies (Ochsner et al., 2004, 2005; Lieberman et al., 2004; Lieberman, 2003; Hariri et al., 1999; Anand et al., 2003; Paquette et al., 2003) tend to show that the prefrontal region regulates the processing of negative affect by inhibiting the activation of limbic regions and the implementation of automatic processes responsible for processing and maintaining negative affect.

Let's take the example of an employee who doesn't like situations of inferiority and weakness, and doesn't like to lose. A remark was made to him by his superior about a task he considers poorly done. He is

⁽²³⁾Damasio, A. R. (2000). Le sentiment même de soi. Corps, émotions, conscience: Odile Jacob, coll.«Sciences, 1999, 380 p., 160F. Nature Sciences Sociétés, 8(1), 88.

⁽²⁴⁾Collignon, P., & Vorst, C. (2013). Le management toxique: Harcèlement, intolérances, missions impossibles... Comment s'en sortir?. Editions Eyrolles. P. 49-50-51.

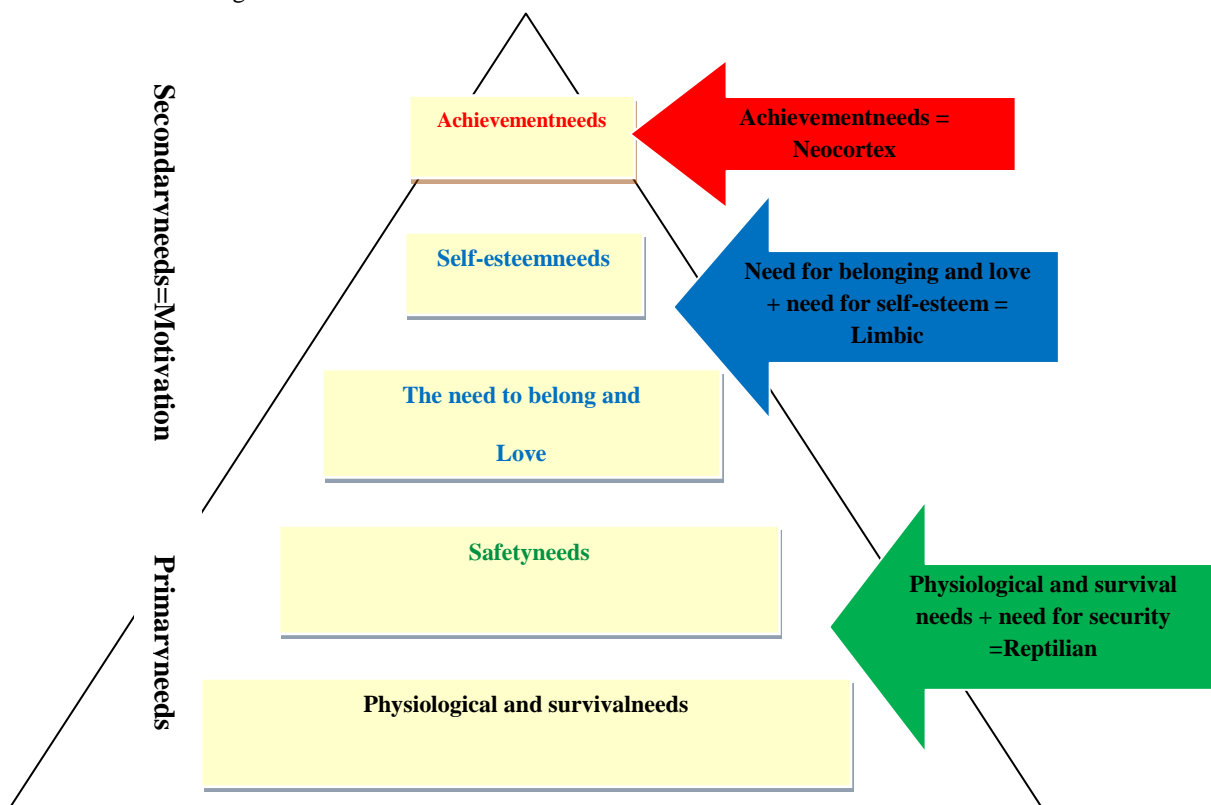
⁽²⁵⁾MAZOUZ, M. (2012). « Les trois cerveaux du manager, entre réflexion, émotion et pulsion », gotomeeting by citrix.

aware that mistakes will enable him to improve, but despite this, his discomfort is growing. He feels annoyed, angry, aggressive, humiliated and irritated by his manager's remark. He is therefore in a state of struggle, and between two opposing modes: his prefrontal (acceptance position), and his irrational refusal (annoyance, anger, feelings of inferiority....). To help him calm down, he can step back and act on his internal reaction to this stressful situation, while putting it into perspective and opening the door to the prefrontal, by doing anti-stress exercises or methods such as brain gym, walking, abdominal breathing, relaxation, neurocognitive meditation, listening to music, eating chocolate, etc. This reframing would enable him to have a constructive exchange with his superior.

Human performance depends on how we use the brain, which sees itself as a diamond that can be cut. Everyone is capable of doing it, and we could all be efficient and productive. What separates a productive, high-performance individual from one who isn't is deliberate practice, the most powerful driving force of which is, of course, love of the task. Once we give voice to the right population of neurons, to perform a task, we can qualify as high performers (IDRISS ABERKANE, 2016).

According to MASLOW (1972), all individuals act because they are motivated, and the essence of their motivations is determined by a set of needs. He distinguishes 5 types of needs (physiological needs, security needs, needs to belong to a group, esteem needs and achievement needs), for him these needs are hierarchized according to a pyramidal logic⁽²⁶⁾. Marleine MAZOUZ⁽²⁷⁾ in his book "Les trois cerveaux du manager, entre réflexion, émotion et pulsion", makes the link between human needs and the three territories of the brain, with the aim of better understanding the structure of an individual, his needs and his motivation.

Figure 3: Link between human needs and the three brain territories



Source: Marleine MAZOUZ, «The manager's three brains: reflection, emotion and impulse», 2012

In the workplace, individuals behave according to the situations they encounter. They want to feel physically and morally secure (reptilian brain), to belong to a group, to feel integrated, valued and respected

⁽²⁶⁾ Herbert Maslow. (1994). vers une psychologie de l'être, traduction de motivation and personality.

⁽²⁷⁾ Consultante et Coach, Analyste Transactionnelle Certifiée en Organisation, Accréditée en Mesure et Management du Stress au travail.

(limbic brain). This is where motivation comes in, and the person begins to blossom (Neocortex Brain). While knowledge of the brain will enable us to better understand ourselves, and consequently the complexity of our environment (Jean-Didier VINCENT, 2007), it will also enable us to better identify the real causes of demotivation, stress, discouragement, fear, burn-out and organizational dysfunction.

Knowledge of cognitive styles enables managers and HR directors to manage human resources effectively, to succeed in the recruitment process, to conduct professional interviews, to delegate and to combine cerebral preferences to exploit complementarities. Employees to develop their intellectual potential for communication, manage and develop their professional careers and leadership skills. Teams to boost collaborative work, accelerate learning, challenge each other on improved performance and solve problems. It also enables the organization to promote a "learning by doing" approach «total brain⁽²⁸⁾», value and manage diversity, and develop innovation and creativity (Lionel Vuillemin, 1986).

Certainly, understanding how we function leads to a more fulfilled life, healthy relationships and a professional environment that reconciles well-being and performance.

IV. Conclusion

Through this work of theoretical enlightenment, we have tried to show that the contributions of neuroscience make HRM a new vision that goes further. Renewing human resources management through neuroscience is an evolutionary vision of HR management, essentially advocating knowledge and understanding of human foundations. Its impact on performance is very significant. Because it enables the interests of the individual, the group and the organization to converge, designing an organization that integrates human reality as a key factor in performance and efficiency.

Only companies that are aware of the need to make a shift in their human resources management strategies, based on neuroscience, will be better equipped to guarantee the sustainability and development of their business. Of course, the "neuromanager", who uses and stimulates cerebral plasticity to manage his teams, has a head start. He won't need a long apprenticeship to decipher behavior, manage change, control employee stress, foster motivation and, of course, improve performance. Scientific research conducted in recent years clearly points in this direction.

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