

International Journal of Human Sciences Research

THE IMPORTANCE OF NEUROAFFECTIVITY WHEN GOING BACK TO SCHOOL

Cilene Maria Cavalcanti

Pedagogue at ``Universidade

Estadual do Rio de Janeiro``

Master in Clinical Psychoanalysis.

Postgraduate in Neurosciences with an

emphasis on learning. Educational Advisor

Queimados –RJ

All content in this magazine is licensed under a Creative Commons Attribution License. Attribution-Non-Commercial-Non-Derivatives 4.0 International (CC BY-NC-ND 4.0).



Abstract: This article was prepared based on the analysis of published literature on how our memory is processed and how brain stimuli using it, in an effective way, it can collaborate with learning. The interview with Professor Adriana Carrijo, published in ``Revista Desassossegos``, endorsed this article. Neuroaffective interventions can help activate memory and support the stimulation of executive functions for individuals to learn. Our article also describes the neuroscience explanation and its neurobiological basis for learning. And, like reading and writing deficits, they can be alleviated, or even overcome, with neuroaffectivity (a process that stores/activates memories based on affectivity). The responsibility for teaching reading and writing lies with the school, all subjects must be involved. And, on the other hand, each of them needs to develop the particularities of reading and writing belonging to the areas of knowledge. It is up to the teacher to promote experiences that contribute to the formation of readers capable of effectively using executive functions. To this end, the film *Monstro Inc.* (2001) was used as an example, to introduce the concepts, as well as to address the feeling of fear. And, to continue the didactic sequence, we propose reading, writing and artistic creation activities that speak to animation.

Keywords: Neuroaffectivity; Learning; Executive Functions; Memory.

INTRODUCTION

In this context, several methods have been created to assist individuals with learning difficulties. These methods have not yet been able to reach widely, due to difficulties. Therefore, it is necessary to resort to knowledge of neuroaffectivity in order to promote neurological activation regarding memory and attention, helping those who have not yet achieved specific skills such as

reading and writing.

This Article also proposes that in the process of acquiring reading and writing the advancement of science in the studies of Neuroscience applied to education must be considered. Coming to consider that currently, professionals in different areas, have been interested in the Central Nervous System of the human organism. Examples of these professionals can be cited: Computer Engineering, Graphic Artists, Pedagogues, Teachers, etc. Therefore, they need to know modern concepts about the human perception of information captured, internally and externally, by man in his interaction with the environment in which he lives, reaching the brain, through the senses.

In this same need, educators obtain, through Neuroscience studies, knowledge of how the central nervous system exercises the ability to select and store information, an important attribute of learning processes. Mainly, with the lack of school interaction imposed on students, due to the COVID-19 Pandemic.

Namely, the diagram below (Figure 1) illustrates an example focused on Neuroscience research when explaining the importance of creativity for us to learn:

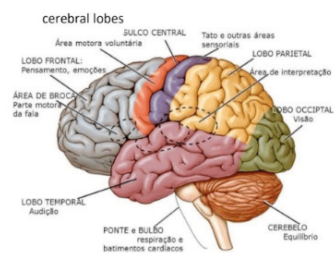


Figure 1 – Human Brain

Source: <https://pt.slideshare.net/cesarmilanijr/sistema-nervoso-40040909> / Accessed on: 23 Aug. 2023.

In this scheme, we find the frontal lobe, the part of the brain responsible for our emotions. In it, there are neuronal cells (neurons) that,

when receiving stimuli from the senses, activate rewards received at regular and predictable times. Thus, they trigger much less brain activity than the same rewards received at random and unpredictable times. The surprise is gratifying.

NEUROAFFECTIVE INTERVENTIONS IN MEMORY ACTIVATION

The most recent studies on memory loss dysfunction point to: Alterations in the emotional states of the mind – caused by childhood trauma – in the psychoanalytic view can cause depression and paralysis. This emotional picture is confirmed in neural communications in accordance with what Kandel advocates when stating that: psychotherapies / analyzes of the unconscious remind us of traumatic events that occurred in the first years of life. This psychiatrist also argues that neuronal communications are processed in the procedural or implicit memory system (unconscious memories). System located in hippocampus. At this stage of unconscious memory, we are completely dependent on our caregivers. (DOIDGE, 2019).

A recent discovery was that early childhood trauma causes a massive plastic change in the hippocampus, shrinking it so that long-term, explicit memories cannot be formed. Animals separated from their mothers let out desperate screams, then go into a state of shutdown – as Spitz puppies did – and release the stress hormone called “glucocorticoid”. Glucocorticoids kill cells in the hippocampus, preventing it from creating synaptic connections in the neuronal circuits responsible for long-term learning and explicit memory. (DOIDGE, 2019).

The research by Austrian neuroscientist Eric Richard Kandel (2000 Nobel Prize in Medicine) was carried out on a giant sea

slug, called *Aplysia*, with its unusually large neurons, and its cells visible to the naked eye. Because it was already known that evolution and the most elementary forms of learning work in the same way in animals with simple nervous systems and in humans. In an experiment with the slug, he proved that it learned to avoid shocks and retracted its gills. The slug’s nervous system changed, increasing synaptic connections between motor and sensory neurons and emitting more powerful signals, detected by microelectrodes.

Kandel proved the following theory with other scientists: when a single neuron evolves a short-term memory into a long-term one, and this happens when the substance called “protein kinase A” moves from the cell body to the nucleus of the neuron, where genes are stored, the protein activates a gene that reproduces another protein and changes the structure of the nerve ending, developing new connections between neurons. The entire process can go on to establish 1,300 to 2,700 synaptic connections. An impressive level of neuroplastic change. The same process happens in the human species. As we see in the following statement “When we learn, we change the genes that are expressed or activated in our neurons.” It can also be said that Kandel’s work shows that when we learn, our mind also affects genetic transcription in our neurons.

Freud, in 1895, proposed the theory “Project for a Scientific Psychology”. This study on Freud’s “synapse” predates Kandel’s, however, at the time, the person who took the credit was the pathologist Sir Charles Sherrington. In the “Project for a Scientific Psychology”, Freud even described how synapses, which he called contact barriers, can be changed by what we learn. He thus anticipated Kandel’s work. He also began to propose neuroplastic ideas. The first plastic concept attributed to Freud is the law of neurons, which fire

connections simultaneously and connect to each other, called Hebb's law. Freud had already proposed such a process in 1888, 60 years before Hebb. Freud declared: when two neurons fire simultaneously, this facilitates their "free association", this technique is used in analyzes by psychoanalysts. Neuroscientists recognize two main memory systems: The memory system developed from ages 2 to 3 is called procedural or implicit memory. It occurs outside of our focused attention, where "words" are generally not necessary. It is stored behind the right eye in the right orbitofrontal system. Full name: right orbital area of the frontal cortex. This system allows us to decode people's facial expressions and emotions, in addition to providing us with interaction. (DOIDGE, 2019).

We learned that the hippocampus converts "implicit procedural" memories from 10 to 12 months of life into explicit memories from 12 to 16 months (long-term memories of people, places, and things) that we have conscious access to. In neuroplastic terms, it allows you to activate and focus attention on the connection between everyday actions.

Kandel states that in these flashbacks and uncontrollable emotions, the blood flow to the prefrontal and frontal lobes, in addition to decreasing, helps regulate behavior. They indicate that these areas are less activated. This is one of the ways the brain reorganizes itself. It can be said that this physiological brain phenomenon happens during our school life. Because, affective memories are created that allow neuronal connections and consequently learning.

TYPES OF MEMORIES AND HOW THEY ARE CLASSIFIED IN RELATION TO THEIR NATURE AND TEMPORAL COURSE

IMPLICIT AND EXPLICIT: NATURE AND TEMPORAL

Nature – With the selection of external stimuli, climate, smells, sounds, etc., the individual begins to internally acquire, through neural circuits, cognition, emotion, among others. Internal emotions are temporarily retained, causing bodily reactions, which are consolidated into long-lasting or forgotten retention. This memory that, for a few moments, is lost, needs evocation.

Regarding the Nature classification, related to Literacy:

- Explicit or Declarative – can be described using words or other symbols (for example, ideogram);
- Semantics – are the memories related to concepts. For example, the knowledge that fish swim in water;
- Implicit or non-declarative – refers to motor procedures, such as writing;
- Perceptual representation – are those evoked by "clues" (priming). For example, memory of the first day of school – clue: pencil – due to the euphoria, he forgot to take it;
- Associative – by sight a food, already known to be tasty, begins to salivate – at this moment, one remembers its smell and taste;
- Non-associative – these are the ones we learn without realizing it. For example, just a dog barking does not cause danger;
- Operational or Working – indicates the brain's ability to assimilate information as it performs a certain task. For example,

to read a text, the brain uses the memory that it has been bringing and storing, in the long term, regarding the subject.

Temporal – memory behavior capable of encoding and retaining information for a longer period of time, which can range from seconds to years.

Regarding the Temporal classification (memory retention time).

Types: – Ultrafast or Immediate /
Subtype: Short duration
– Long term

- Ultrafast or Immediate – can last from fractions of seconds to a few seconds. It characterizes sensory or immediate memory;
- Short duration – lasts minutes or hours. Ensures a sense of continuity in everyday actions;
- Long lasting – lasts hours, days or years. It guarantees the recording of the memory of the individual's autobiographical past and knowledge. Types of long-term memories. There are two types of long-term memory that differ by whether or not they involve conscious perception, necessary for recall. These are implicit and explicit memories:

a) Implicit memory – non-declarative: Unconscious form of memory, observed during the performance of a task. It manifests automatically, with little conscious processing. Strongly dependent on the original conditions under which learning took place. Subtypes: Priming; Of procedures; Associative learning; Non-associative learning, specified above. “When we learn, we change the genes that are expressed or activated in our neurons.” (KANDEL, 2000).

Procedural or implicit memory, also called unconscious memory, occurs at the stage when we are completely dependent on our caregivers. These are the “memories” that we don't remember when we form long-term

memories. Neurons change their shape and increase the number of synaptic connections they have with other neurons.

b) Explicit Memory – declarative: These are conscious memories of past experiences. Knowledge of facts about people, places and things. “Highly flexible, allowing the association of multiple pieces of information under different circumstances.” (KANDEL et al., 2014, p. 1261). It occurs in two forms: Episodic (events) and semantic (facts). It begins to develop after 2 years of age. They are memories of specific facts. It helps organize memories in time and space. By relying on speech, we can remember and describe the facts, identifying when they occurred.

The largest memory system responsible for declarative (explicit) memory is located in the medial temporal lobe. This region interacts with the amygdala (group of neurons responsible for regulating our emotions), based on a deep emotional connection between episodic memories and places. This interaction process is necessary to form long-term memories and to transform information about facts and events from short-term memory. (DOIDGE, 2019).

Freud's discovery, in 1891, that complex mental phenomena, such as reading and writing, are not restricted to distinct cortical areas, and that there was a brain “center” for literacy, since it is not innate, It was the beginning for understanding the influence of the brain on the course of learning. He stated that the brain, over the course of our lives, must dynamically reorganize itself – and reconnect itself – to perform such culturally acquired functions (reading and writing).

THIS IS MEDIATED BY FOUR DISTINCT PROCESSES:

1. Encoding: process where new information is connected with pre-existing information in memory. They are processed more successfully when there is motivation to remember.
2. Storage: Mechanisms and neural sites that allow long-term memory retention.
3. Consolidation: makes the information, temporarily stored, more stable.
4. Evocation: brings back to mind different types of information stored in different locations in the brain.

BACK TO SCHOOL: CARING FOR STUDENTS AFTER THE PANDEMIC

When returning to school, after a long break, in the phase of human development in which children find themselves, activities must consider the lack of unacquired skills and favor the creation of a new structure of cognitive functions. The important thing is not to neglect the reading comprehension component itself. Research has shown that students can be better taught to understand certain content according to the type of instruction that benefits this learning. Teaching explicitly, using reading comprehension strategies with intentional actions, is an action that must be used during the process of guiding thinking. This facilitates the reworking of executive functions (perception, attention, memory, thinking, language and learning). These strategies on how and when to use certain information when reading texts constitute “tools” that students deliberately use to better understand what they “read”, which can occur before, during and after reading texts.

The most effective approach to teaching involves a gradual release of teacher responsibility, starting with demonstrating

and modeling the target strategy, through guiding the student to use it successfully within reading, to independent practice. It is, therefore, an approach based on demonstration, modeling, direct explanation and guided practice.

To assist practice, the teacher can develop reading skills, as well as some pedagogical intervention programs, that is, activities to promote understanding, covering very diverse areas, which include: phonological processing, reading fluency, prosody, vocabulary, phonological working memory, knowledge of the world and mental models, understanding and linking sentences, textual structure, inference and monitoring skills.

Assessment and monitoring of student performance is a fundamental condition for the systematic and explicit teaching of reading: formative in nature and the last two of a summative nature:

- curriculum-based assessment (assessment to determine what the child knows and does not know);
- curriculum-based measures (monitoring progress in learning); criterion-referenced assessment (assessment carried out by reference to previously defined purposes and objectives);
- normative assessment (assessment with resources and self-knowledge tests).

In summary, considering that the promotion of word recognition skills and language comprehension skills require different teaching strategies, the assessment of children’s reading comprehension level acquires a central role. It is by determining what learning readers know and what they need to know to become skilled readers that it will be possible for the teacher to make instructional decisions that better and more directly respond to their individual needs.

We must consider the students’ experiences and their interests, starting from their

cultural context to expand their knowledge, with the aim of using popular knowledge and playfulness as facilitating agents in the teaching/learning process of literacy and literacy. This type of proposal values the student's culture, consequently raising their self-esteem and making learning more enjoyable, because it affects their sensitivity in a positive way.

By exploring fear in a playful way, using the film "Monsters Inc." can be positive in approaching the subject with children. The activities use the animated film as a pedagogical tool to encourage the development of children in literacy classes in different languages.

Aimed at the first and second years of Elementary School, they consist of activities divided into three parts:

1) The first (Place and fear) is made up of four activities and, starting with the film screening, explores geographic concepts based on the space where the child sleeps, and children's fears. Debate and drawing are the strategies used to develop these themes.

In the film, the plot revolves around the theme: FEAR. Where the featured Monster enters a safe space for children, in this case their bedroom, disrupting the entire relationship of territory in the house.

After showing the film, we suggest a debate about the child's relationship with their sleeping place and fear, followed by a drawing about the space where the child sleeps, and returning to the debate based on the images produced by the students.

2) The second part (Fear in Brazilian popular culture) aims to address fear in children's imagination by associating the film's monsters with the myth of the Bogeyman, bringing the knowledge of the school community into the classroom.

The first activity is the presentation of the folk song "Bicho-papão", from which activities of exploration and analysis of reading and

writing were developed.

So that everyone can follow the reading. Regarding reading the text, Carvalho highlights "the importance of extralinguistic aspects in interpreting the text" and recommends "the teacher checks what the student knows about the reading topic and what the connection is between their experiences and the text itself, to facilitate the creation of a dialogue between author and reader." (CARVALHO, 2010, p. 53).

That's why we recommend an informal conversation with students about the theme of music. The musical text is excellent for reading by following the words with your finger as you read them, because students know what is written and can make the phoneme/grapheme relationship more easily. A slower reading by the teacher, pointing word by word of the text (on a support that the students can see) as he reads them, will help in understanding that every time a word is spoken a written word appears in the text and that there is a space that separates the words. "Making this correspondence between sound units and graphic units: this is the way to understand how writing can represent speech." (CARVALHO, 2010, p. 28).

Addressing different musical texts brings playfulness to the classroom and is a great way to awaken and develop affection.

In the following activity, two games from the Brazilian children's universe, "tag" and "hide and seek", were adapted to promote the theatricalization of the child's relationship with the Boggart. For this activity, students will produce a collective visual text. They will choose the characteristics of the Boggart that will be represented through a mask and used in games.

Continuing with the encouragement of children's imagination, each student is invited to create their own Boggart using one of the visual languages (drawing, painting,

sculpture, etc.). To continue stimulating children's creativity, children will then fill out an identification sheet for their monsters, with various information, from their name to their fears. The words and phrases created by students in this activity can be explored in later exercises.

Taking advantage of this character creation, and to stimulate oral speech, each person will transform their Bogeyman into a stick puppet or mask, which are subdivisions of Animation Theater. After a moment of free play with the puppet/mask, the performance will be divided into two moments, the first is a monologue, where each student presents their character using the information from the form they filled out, then, in pairs, they improvise a dialogue between beings.

3) The last part of the notebook (Writing and drawing fear) begins with a collective textual production, with the teacher as scribe. For this writing, students will be able to use all the references accumulated from previous activities, as well as those experienced outside of school. This must be a time to reflect on writing.

This text will be reproduced on sheets of office paper that will become books illustrated by the students, so each one will show their personal interpretation of the text with their drawing and will be able to transform their Bogeyman (Corona virus) into the main character of their book.

We closed the proposal with a reading circle, where students will be able to read the writing and images of the books made.

The reader uses in reading what he already knows, the knowledge acquired throughout his life. It is through the interaction of different levels of knowledge, such as linguistic knowledge, textual knowledge, knowledge of the world, that the reader is able to construct the meaning of the text (CARVALHO, 2010, p. 90).

The general objective is to use popular

knowledge and playfulness as facilitators in the teaching/learning process of literacy and literacy. The specific objectives are: to expand the imagery repertoire and vocabulary; encourage orality; awaken emotions that stimulate attention and creation; stimulate expressiveness through verbal and plastic language; expand the imagery repertoire; learn about some aspects of Brazilian Popular Culture; stimulate the reading and writing of verbal and visual text; differentiate verbal, written and visual text; experience social uses of writing and Art; use Art as a resource for interpreting verbal texts; and develop attitudes of respect and collaboration among students and reintegrate students into the school context in a playful way.

Roberto Lent, neuroscientist at ``Universidade Federal do Rio de Janeiro`` (UFRJ), states that research inspired by education:

It could be research into memory, neuroplasticity, synaptic transmission, literacy and learning disorders. There is room for basic science and the development of products, such as video games that help learning. The objective is to expand knowledge about the most efficient ways of teaching and transfer it to the classroom. It is, therefore, a form of translational research, which consists of accelerating the transfer of results from basic to applied research in the area of education. (LENT, 2021).

Therefore, we also propose that in the process of acquiring reading and writing, the advancement of science in the studies of Neuroscience applied to education be considered. Therefore, modern concepts about the human perception of information captured, internally and externally, by man in his interaction with the environment in which he lives, reaching the brain, through the senses, can promote transformations of lives in a society.

In this same need, educators obtain,

through Neuroscience studies, knowledge of how the central nervous system exercises the ability to select and store information, an important attribute of learning processes:

Whatever our age, only a story that conforms to the principles underlying our thought processes is capable of convincing us [...] – this is exclusively true in the case of children. Your thinking is animistic. (BETTELHEIM, 2019, p. 67).

FINAL CONSIDERATIONS

Reading the world is necessary for the full development of the individual and the exercise of their citizenship, it is necessary that literacy and literacy develop together in the teaching-learning process, and not only that, but that they happen in multiple languages. From the film *Monsters, Inc.* (2001).

Our intention is to suggest that popular knowledge and playfulness as a facilitator in the teaching/learning process of literacy and literacy. School content needs to dialogue with life to make sense to students. With interesting activities for children, such as cartoons, music, art and games, in order to stimulate executive functions, essential for students' learning.

With this – as previously mentioned here –, we learn that in the frontal lobe, the part of the brain responsible for emotions, neurons, when receiving stimuli, activate rewards and, thus, trigger important brain activities. The surprise is truly gratifying.

REFERENCES

- BARBOSA, Ana Mae Tavares Bastos. *A imagem no ensino da arte: anos 1980 e novos tempos*. 8 ed. São Paulo: Perspectiva, 2012.
- BETTELHEIM, Bruno. *A psicanálise dos contos de fadas*. 37 ed. Rio de Janeiro/São Paulo: Paz e Terra, 2019.
- CARVALHO, Marlene. *Guia prático do alfabetizador*. 1 ed. São Paulo: Ática, 2010. (Série Princípios).
- CAVALCANTI, Cilene Maria. *A bolsa amarela guarda: a importância das terapias para o desenvolvimento humano*. Rio de Janeiro-RJ: Autografia, 2020.
- DOIDGE, Norman. *O cérebro que se transforma*. Tradução de Rytá Vinagre – 13 ed. – Rio de Janeiro: Record, 2019.
- KANDEL, Eric R.; SCHWARTZ, James H.; JESSEL, Thomas M.; SIEGELBAUM, Steven A.; HUDSPETH, A. J. *Princípios de neurociências*. Tradução de Ana Lúcia Severo Rodrigues [et al.]. 5 ed. Porto Alegre: AMGH, 2014.
- ENTREVISTA – *Revista Desassossegos*. Com: Adriana Carrijo. Por: Raquel Zanini. Disponível em: <https://issuu.com/revistadesassossegos/docs/desassossegos_vol_7>. Acesso em: dezembro de 2021.
- LENT, Roberto (a). *Diferenças na estrutura cerebral podem determinar dificuldades de alfabetização*. Disponível em: <<http://www.abc.org.br/2021/08/02/diferencas-na-estrutura-cerebral-podemdeterminar-dificuldades-de-alfabetizacao/>>. Acesso em: dezembro de 2021.
- LENT, Roberto (b). *Artigos de Roberto Lent sobre neurociência e educação são publicados n'O Globo*. Disponível em: <<http://innt.org.br/neurociencia-e-educacao-sao-temas-de-artigos-de-roberto-lentpublicados-no-globo>>. Acesso em: dezembro de 2021.
- LENT, Roberto (c). *Roberto Lent: Especialista em conexões*. Disponível em: <<https://revistapesquisa.fapesp.br/roberto-lent-especialista-em-conexoes/>>. Acesso em: dezembro de 2021.