RCMOS – Multidisciplinary Scientific Journal of Knowledge.
ISSN: 2675-9128. São Paulo-SP.
Year V, v.1 2025. | submission: 2025-07-11 | accepted: 2025-07-13 | published: 2025-07-15

HOW *STORYTELLING* IMPACTS EMOTIONS: AN APPROACH INTERDISCIPLINARY BETWEEN LANGUAGE, NEUROSCIENCE AND PSYCHOLOGY

HOW STORYTELLING IMPACTS EMOTIONS: AN INTERDISCIPLINARY APPROACH BETWEEN LANGUAGE, NEUROSCIENCE, AND PSYCHOLOGY

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ABSTRACT

Human communication is one of the most important tools for the evolution of humanity, since from language came the art of storytelling and with it the transmission and propagation of knowledge, construction of identity and cultural memory.

Along these lines, this article aims to present storytelling as a powerful communication tool for building emotional connections. To achieve this goal, we opted for a literature review, focusing on the historical evolution of language, storytelling, narrative transport, Paul Zak's experiment on how oxytocin impacts the brain, and Albert Bandura's social learning theory.

Keywords: Storytelling. Language. Neuroscience. Psychology. Emotion.

ABSTRACT

Human communication is one of the most important tools for human evolution, as language gave rise to the art of storytelling, and with it the transmission and propagation of knowledge, the construction of identity, and cultural memory. In this vein, this article aims to present the technique of storytelling as a powerful communication tool for building emotional connections. To achieve this goal, we opted for a literature review, focusing on the historical evolution of language, storytelling, narrative transport, Paul Zak's experiment on how oxytocin impacts the brain, and Albert Bandura's social learning theory.

Keywords: Storytelling. Language. Neuroscience. Psychology. Emotion.

1. INTRODUCTION

Language is a central point in the evolution and history of humanity, through symbolic and subsequently structured language gave rise to all social and cultural organization. Beginning with pictorial communication, as demonstrated by the cave paintings analyzed in materials such as those from the British Museum (2012) human beings have advanced in the ability to count stories in an initially symbolic way and went beyond the transmission of sounds. The combination between visual symbols made it possible not only to record events, but also to create

ISSN: 2675-9128. São Paulo-SP.

senses, generating identity, expression and cultural continuity. In this way, the art of storytelling has emerged historically as a narrative device rooted in evolution of language, with the potential to impact not only cognition, but also circuits emotional aspects of the brain and generate behavioral responses from this. Contextualization history of language and its use in structured narratives is important to begin cultural origin of *storytelling.*

> The concept of narrative in which the *Storytelling* approach is inserted , the narrator presents existing knowledge, reconfiguring the way it is told, described and presented, adding subjective aspects that make the narrated fact a contextualized, pleasant and simple language, seeking to bring the interlocutors closer together (FONTANA, 2009, p. 20-21).

The article by Sánchez Rivas *et al.* (2024) reinforces that well-structured narratives promote involvement, engagement and meaningful learning, especially when integrated with digital technologies. In this way, the investigation of the internal mechanisms that make storytelling an effective practice is essential to understanding its impact not only symbolic, but also neurological and behavioral.

The research focused on investigating what the neuroemotional impact would be of *storytelling* in the reception of narrative by the subjects. Based on the research and hormonal response to narrative stimuli, we sought to understand how certain story structures trigger specific emotions and promote a response behavioral. This central theme guided the choice of authors whose academic production directly connects narrative structures to biological systems.

Based on the main objective, three central objectives were defined: a) Present the origin and evolution of language from its rudimentary and symbolic development to the narrative structure; b) Understand the storytelling technique; c) Describe the effects neurobiological, emotional effects provoked by stories.

2. METHODOLOGY

The methodological approach chosen for the study was qualitative in nature and bibliographical. The theoretical foundation has both classical and contemporary authors. The structure of historical evolution was based on Samuel Souza and Johann's Bow-wow theory Herder, while the neuroscientific dimension was supported by the work of Paul Zak. The

social and behavioral dimension of learning was contextualized based on the contributions of Albert Bandura. The persuasive component of the stories, in turn, was articulated from the Theory of Narrative Transportation, formulated by Melaine Green and Timothy Brock.

In addition to the introduction and methodology, the article presents the following topics:

- Language evolution
- When the story takes us: storytelling and the power of narrative transportation
- How stories impact the brain from the perspective of neuroscientist Paul Zak
- Social learning theory Albert Bandura a contribution to behavioral modeling
- Conclusion and final considerations

Thus, this work sought to provide an understanding of storytelling as a resource of emotional impact, based on symbolic, narrative and neuropsychological.

1. EVOLUTION OF LANGUAGE

The principle of the evolution of language is the expression of the symbolic human being, the first symbols is a rudimentary creation that is expressed from natural drawings, thus, the origin of language dates back to the prehistoric period and is considered first degree of language, symbolic language. In any case, man has reached the association of sounds and gestures to designate an object, giving rise to the sign (BORDENAVE, 1982, p. 24). Thus, symbolic communication is a way of telling stories based on what is experienced and has as its main mission to record and transmit a message to the community.

Figure 1 illustrates a hunting scene drawn in ochre pigments on rock. These cave paintings are not just reproductions of natural scenes, they constitute records cultural and pre-verbal narrative structures.

ISSN: 2675-9128. São Paulo-SP.

Figure 1 - Cave painting of a hunting scene

Source: British Museum, 2012.

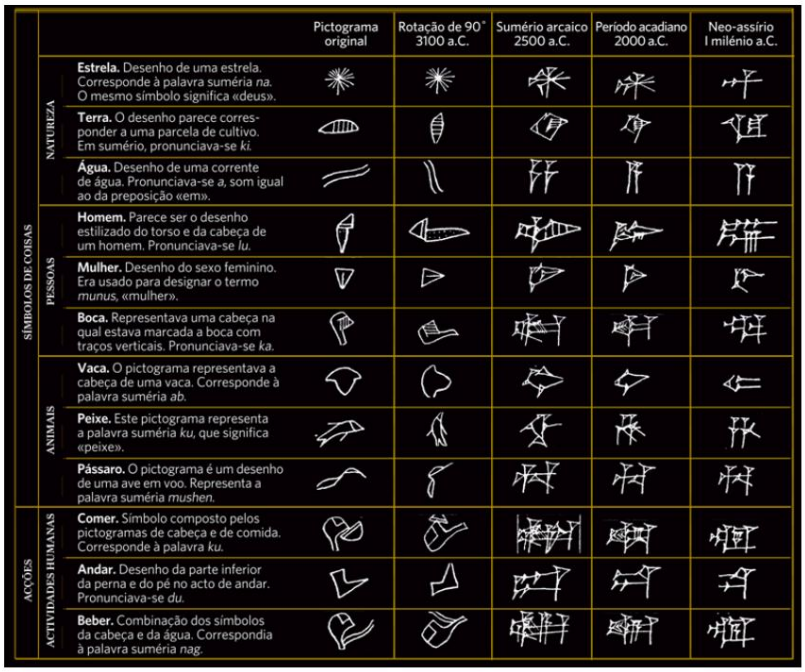
The first records found come from the Lower Paleolithic: the Stone Age, during this period hominids communicated through cave paintings made on rocks in caves, they used paints made from plant sap, ochre, charcoal and animal blood to record everyday life and represent scenes such as hunting situations and forms of attack in band, these paintings served the purpose of transmitting experiences and learning to the next generations.

Cave paintings symbolized everyday life for the Upper Paleolithic, and through from these figures of speech the succession of stories was created. Later the verbal language. According to the Bow-Wow theory developed by the German philosopher Johann Herder in the 18th century, verbal language developed from the imitation of sounds, mainly of animals, such as the sound of birds, tigers, wolves and others, creating a bridge between the outside world and human expression.

This gradual development consolidated language as an instrument onomatopoeic essential for the transmission of warnings and the construction of culture. First through visual language as seen previously, and then the evolution of writing cuneiform that was passed down through the Sumerian peoples.

RCMOS – Multidisciplinary Scientific Journal of Knowledge.
ISSN: 2675-9128. São Paulo-SP.

Figure 2 - Evolution of cuneiform writing



Source: National Geographic, 2023.

For Souza (2020) man tried to express the events that he considered most important through drawings (pictographic) on the cave walls. However, the cave painting is not considered a form of writing, as there was no standardization in graphic representations and there was no organization in the sense of what they wanted communicate. Thus, from the Sumerian civilization, tangible records were developed with the aim of recording commercial transactions of the time. Rosa (2012) describes that the writing of Sumerian signs were an invention that arose around 3,500 BC, in Uruck, one of the cities of Sumer, due to the need to record the activities and decisions of the leaders, as well as commercial interests.

> From historical-cultural theory, we can understand that writing is a system of instruments because it manifests itself externally through its social functions, for example, reporting, entertaining, disseminating, and communicating. It is also a system of signs because it modifies man's relationship with himself when he uses writing to organize and systematize ideas, to obtain knowledge and pleasure, or as a resource for memory (ANDRE; BUFREM, 2012, p. 28).

Thus, the quote above demonstrates that the historical-cultural perspective understands that communication goes beyond writing, it is an instrument that acts socially to fulfill the purpose aim to inform, tell stories and connect with other people.

4. WHEN HISTORY TAKES US: STORYTELLING AND THE POWER OF NARRATIVE TRANSPORTATION

Over the years the need to tell stories has become increasingly essential, whether to mark an era, transmit knowledge or retain the attention of listener. After the prehistoric era, sophistication in the transmission of messages was giving in a more structured way. In the 90s, the term coined as *Storytelling.*

> Storytelling is the art of telling stories, creating a compelling narrative to convey the desired message in an attractive and effective way. This persuasive technique is primarily used to promote businesses and sell services indirectly. However, it can also be used in our daily lives as a way to achieve our goals (PINTO, 2023).

Storytelling has the empirical objective of conveying ideas and narratives to create a connection from a message, whether to spark interest, engage the public or generate emotional appeal, this language can be linked to the concept of narrative transport. “The narrative transportation is an experience in which all mental processes (i.e., attention, emotion and imagery) focus on the events that occur in the narrative” (GREEN; BROCK, 2000, 2002, our translation). Narrative transportation theory is described as a process psychological in which the subject becomes so deeply involved with the story that, experiencing a connection with the setting, characters and narrative, the listener embarks into the world of the story, while temporarily disconnecting from reality.

> The narrative transportation construct is grounded in narrative transportation theory and is a process in which an individual becomes absorbed in a story, connecting with the characters and the story's environment while simultaneously disconnecting from their physical environment (GREEN; BROCK, 2000).

In this sense, storytelling is related to a narrative cohesion that leads the subject to enthusiastically invest your attention in understanding the beginning, middle and end of a message, more than reporting facts, storytelling structures information into a narrative coherent, with well-thought-out characters, visually appealing scenery, conflicts and resolutions that facilitate emotional connection and content retention. For this reason, *storytelling* can be associated with narrative transportation, as both are capable of being used for the same ultimate goal, to tell stories with details that bring the listener closer, to generate involvement and emotion from a narrative, use elements with persuasive impact and influence perceptions and emotions through what is told.

> According to the experiment by Bezdek and Gerrig (2017), memory reaction time tests were used to assess participants' attention to different film excerpts. Their results suggested that the level of focused attention varied, with greater concentration of attention occurring at moments of greater suspense in the narrative (BEZDEK; GERRIG, 2017, our translation).

However, the conduction of narrative transport does not occur in all cases, in the study of Hamby, Brinberg and Jaccard (2018), Hamby, Brinberg and Daniloski (2017) it was demonstrated that the effect of narrative transportation occurs more easily when the personal experience of the individual does not contradict the story told, when there is contradiction the behavioral character adopted is a critical mode of processing and soon the narrative transport is interrupted.

5. HOW STORIES IMPACT THE BRAIN

Paul Zak's study *"why inspiring stories make us react: the neuroscience of narrative"* exemplifies in a tangible and well-founded way what behavior the structure narrative of a story has on the human brain. The article argues for the biological effects achieved through an experiment by observing what the brain does naturally and substantially how the brain reacts through substance use.

"My studies complete the causal loop by measuring what the brain does naturally and then intervene in this system through drugs, demonstrating that the behavior can be provoked" (ZAK, 2015, our translation).

The experiment consists of measuring the hormonal response of participants exposed to videos with emotionally sensitive narratives, the first video demonstrates two characters in a situation of suffering, the main character is "Ben" a boy with a terminal illness and the second character is his father, the story shows the two playing while the father talks to the camera about what is happening, and says he is enjoying it the last months of the life of the son who is in the terminal stage of brain cancer, at the end of the video has a final message, "until the last breath." The response to the video was surprising, even though the participants were aware of the fictional nature of the story, the narrative was moving and released hormones such as cortisol and oxytocin in the listener, the induced empathy motivated the participants to donate money to help in some way. "The heightened empathy motivated participants to offer money to a stranger who was part of the experiment.

We connect a story to a feeling and then to a behavior that follows.

social." (ZAK, 2015, our translation).

In a second phase, the video took place in a zoo, this time there was no

no explicit message, just the boy with shaved hair playing with his father

in a zoo, at this second point, the experiment did not achieve the same responses and the

members revealed that without the narrative there was no empathetic involvement as in

first video, in this case the supported hypothesis is that the attentional process and transport

narratives do not work only through images, but through a message

transmitted with climax.

> We confirmed that stories that sustain attention and generate emotional resonance produce post-narrative gifts—even stories with difficult themes. For the brain, good stories are good stories, whether in the first or third person, with happy or sad themes, as long as they make us care about the characters (ZAK, 2015, our translation).

To strengthen the research, Zak advanced the experimentation through intervention with

drugs, the objective was to consolidate the correlation between oxytocin and behavioral response

prosocial. At this time, forty participants received either 40 IU of oxytocin or placebo.

To ensure technical and methodological rigor, neither participants nor examiners

knew who had administered placebo or oxytocin, so the study continued and after a

time, with oxytocin under effect, the participants began watching the videos. The response

of the research was that participants who received synthetic oxytocin donated 56% more,

this confirms the relationship of the role of oxytocin in behavior in prosocial causes after

narratives developed with a dramatic arc.

6. SOCIAL LEARNING THEORY ALBERT BANDURA

Given what was seen in the previous topics, there is always a response behavior

in the face of stories, Albert Bandura's social learning theory explains how people

express new behaviors and attitudes through observation and imitation of the environment.

According to Bandura (2001) sociocognitive theory provides an agentic conceptual framework

to analyze the determinants and psychosocial mechanisms through which

symbolic communication influences human thought, affection, and action. This process of

observational learning is called modeling and is effective in narrative concepts,

in which characters (fictional or real) serve as models of behavior and behavioral modulation.

> In this transactional view of self and society, personal factors in the form of cognitive, affective and biological events, behavioral patterns and environmental events operate as interactive determinants that influence each other in a bidirectional manner (BANDURA, 2001).

Bandura asserts that in these agentic transactions, people are producers as well as products of social systems, the author attributes to sociocognitive theory the effectiveness and importance of vicarious, symbolic and narrative processes, this means that cognitive factors determine, in part, which environmental events will be observed, what significance will be given to them, whether they will leave lasting effects, what emotional impact and motivational power will have and how the information they transmit will be organized for future use.

These mechanisms prove to be even more effective when the narratives present real conflicts and intense emotions, as occurs in stories with a dramatic structure. This logic also applies to Paul Zak's (2015) experiment, in which participants in the experiment when listening to an exciting story, resulted in pro-behavior social donation. Although the focus of Zak's study is on oxytocin release, conversion of this hormone into action can be explained by Bandura's model: the experiment participants connect when observing the father's behavior in the story, recognized their pain, connected emotionally, and were moved to act in a way solidarity.

7. DISCUSSION: TELLING, MOVING, TRANSFORMING

The article carried out a search for information through interdisciplinary analysis, thus way the development of in-depth research has managed to achieve historical records beginning in the Lower Paleolithic era and its form of communication through art cave painter, who orchestrated scenes and rituals on the cave walls in order to convey a message. Since those ancient times, the power of narrative has been established as a symbolic, emotional and behavioral resource. According to Bandura (2001). Through symbols, people can communicate with others over any distance in time. The transmission of a message initially used as a form of pictorial record, evolved until become what we know today, an act of storytelling to retain attention, to enchant,

transport to a place or respond to a behavior through hormonal activations complex.

The concept of narrative transportation proposed by Green and Brock (2000, 2002) explains that "narrative transportation is a process in which an individual becomes absorbed in a story, connecting with the characters and the story's environment while simultaneously disconnects from its physical environment." Green and Brock (2000) Green and Brock's narrative transportation Brocks allowed us to understand how the subject, when deeply involved with a story, begins to experience intense emotions of empathy, as exemplified by experiment (ZAK, 2015). Involvement in emotionally moving narratives even demonstrates that biological changes, such as increased oxytocin, promote prosocial behaviors such as donation.

The emotional impact seen in this article is not limited to just activations neurochemicals, but it also highlights in an interdisciplinary way the articulation of knowledge, such as example the emotional and modeling impact contemplated by learning theory social (BANDURA, 2001). In this case, it is clear that emotional involvement is a factor determinant in vicarious learning, when observing the behaviors of characters with the with which the subject identifies, transforms and begins to incorporate attitudes and values, essentially when you believe you receive positive consequences from the action.

Overall, this article demonstrated the correlation between emotion, cognition and behavior and confirmed that narrative, as well as *storytelling,* operates simultaneously in different senses, namely, symbolic, emotional, neurological and social. In addition to telling a story and conveying a message, it teaches and influences behavior. This material can be used in areas such as advertising, education, clinical psychology and public policy, the field of exploration for such knowledge is broad and can be used as a means of generating engagement, learning and change behavior.

CONCLUSION

The article's main objective was to analyze how narratives impact human emotions from the interdisciplinary fusion of language, neuroscience and psychology

social, so that the research becomes possible, articles with the theme of historical evolution of symbolic language until the construction of structured narrative, permeating key elements such as Bow-wow theory, narrative transportation theory, release of hormones such as oxytocin and the behavioral modeling proposed by Albert Bandura. It was concluded that storytelling is a multifaceted tool with wide potential for application and when aligned with other theories of knowledge it can be constructed deep emotional engagement, eliciting measurable biological responses and motivation in prosocial behaviors. The limitation of the study was the lack of research on the thematic in Portuguese, the study was based on a bibliographic survey, as well as research future studies may benefit from experimental approaches that confirm the mechanisms presented here.

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