

Neuroscience and Homiletics in Dialogue:

Perspectives for Preaching

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Abstract

“One thing is for sure, and can be observed: when someone preaches about some topics of justification, the people sleep on the sermon, or start coughing [...], but when [the preacher] starts telling stories or giving examples, then they become interested, remain silent and pay careful attention”. [Martin Luther]

Could neuroscience help us to comprehend the phenomenon that Luther observed? What does neuroscience tell us about the sermon listener? How and when do they hear? The intent of this article is to put neuroscience in dialogue with homiletics; to comprehend neurological processes attached to hearing through the emotional system resulting in cognitive processing with synapses and memory. Neuroscience impulses are related to preaching, especially preaching with a focus on narrative form.

1. Introduction

The modern history of neuroscience is still being written.¹ Neuroscience has a long tradition of focusing on this object.² However, while science with its status, it is recent.³ Its field of activities is broad, thereby also increasing several areas of knowledge, such as biology and medicine (contributing to the survey area of brain activities, regeneration research about the injured brain, the affect of drugs on mirror neurons, etc.),⁴ psychology (contributing to the survey area of human

¹ Usually we speak of neurosciences (plural), signaling that it is not univocal, but dialogues with other areas of knowledge and is integrated into them.

² Robert-Benjamin Illing, *Geschichte der Hirnforschung*. Lexikon der Neurowissenschaft. Heidelberg 2000.

³ The last decade of the last century (1990–1999) was declared the decade of the brain by President George W. Bush.

⁴ As an example, we mention the studies undertaken to understand the role of drugs on the brain. Kamila Fernandes Ferreira/Sabliny Carreiro Ribeiro/Luiz Gonzalo Gomes Barreto. O prazer do crack. Dourados: Universidade Federal da Grande Dourados UFGD, Anais do 3º Simpósio Internacional de Neurociências da Grande Dourados, vol. 1, 2012.

behavior),⁵ education (contributing to research that helps to understand how the brain learns),⁶ Philosophy/Theology (reconsidering the human's identity, how conscience, faith is formed, etc)⁷ and, recently, artificial marketing and intelligence.⁸

In the area of neuroscience two distinct visions with correlating methodological approaches compete. The first seeks to find and associate a specific neuron with each human action or behavior. Here there is a reductionism of human beings to electrochemical phenomena in the brain. The second view perceives the nervous system with a much more holistic dimension. The objective, in that case, would not be to ask “why” first but to ask “how.” Both views are not mutually exclusive.⁹

In spite of the range of approaches that neurosciences allow, in this article we will focus on systems of neuroscience and cognitive neuroscience with regard to our interest in relating neuroscience to homiletical science. Neuroscience can fertilize reaching, specifically understandings of the process of listening to preaching. For example, when listeners participate in a service and listen to a sermon, they are involved in their entirety. In other words, their corporeality¹⁰ enables the mention of a single word to bring a smell to memory; a sentence might

⁵ An emblematic example is the case of *Phineas Gage*, an American worker who in 1848 worked on the construction of a railway. By placing the powder in a crack in the rock, the friction of the iron rod with the rock caused a spark, causing the powder to explode. The iron rod entered the left cheek, destroyed his eye and left the front of the skull. Despite the serious accident, Phineas survived and recovered relatively quickly, to everyone's amazement. However, after a few months, a radical change in Phineas' personality was observed: he started acting rudely, disrespectfully, without measuring the consequences. Gage's case was considered one of the first scientific evidences to indicate that injuries to the frontal lobes of the brain can alter a person's personality, emotions and social interaction. Cf. *Péricles Maranhão-Filho*, Mr. Phineas Gage e o acidente que deu novo rumo à neurologia. *Revista Brasileira de Neurologia*. Rio de Janeiro: UFRJ, vol. 50 (2014), no. 2, 33–35.

⁶ *Ramon M. Cosenza/Leonor B. Guerra*, Neurociência e educação: como o cérebro aprende. Porto Alegre 2011. *Fernanda Antoniolio Hammes de Carvalho*, Neurociências e educação: uma articulação necessária na formação docente. Rio de Janeiro, vol. 8 (2011), no. 3, 537–550. *Gilson Lima*, Redescoberta da mente na educação: a expansão do aprender e a conquista do conhecimento complexo. Educação & Sociedade. Campinas: UNICAMP, vol. 30 (2009), no. 106, 151–174. *Marta Pinheiro*, Aspectos históricos da neuropsicologia: subsídios para a formação de educadores, *Revista Educar*, Curitiba: UFPR, no. 25 (2005), 175–196.

⁷ *Edenio Valle*, Neurociências e religião: interfaces. *Revista de Estudos da Religião*. São Paulo: PUC, no. 3 (2001), 1–46. *Ulrich Eibach*, Gott im Gehirn? Ich – eine Illusion? *Neurobiologie, religiöses Erleben und Menschenbild aus christliche Sicht*, Wuppertal 2006. *José Manuel Gimenez-Amaya*, ¿Dios en el cerebro? La experiencia religiosa desde la neurociencia, in: *Scripta Theologica*, vol. 42, 2010. *Rhawn Joseph* (ed.), *Neurotheology. Brain, science, spirituality and religious experience*. California 2002. *Raul Marino, Jr.*, A religião do cérebro: as novas descobertas da neurociência a respeito da fé humana, São Paulo 2005. *Gerson J. Pessoa Fischer*, fenômeno espontâneo ou neural? Uma crítica ao dualismo cartesiano na teologia., in: *Reforma e Educação Anais do 1º Simpósio Internacional de Lutero*. São Bento do Sul: União Cristã / FLT, 2012. *Juan José Sanguinetti*, El desafío antropológico de las neurociencias. *Rivista di scienze dell'educazione*. Roma: Pontificia Facoltà di Scienze dell'Educazione “Auxilium”, vol. 53 (2015), no. 3.

⁸ *Gerhard Raab/Oliver Gernsheimer/Maik Schindler*, Neuromarketing. Grundlagen Erkenntnisse Anwendungen, Wiesbaden 2009. *Jochen Thinius/Jan Untiedt*, Events – Erlebnismarketing für alle Sinne: Mit neuronaler Markenkommunikation Lebensstile inszenieren, Wiesbaden 2013. *David Scheffer*, Neuro Sales: Mehr Verkaufserfolg durch Hirnforschung?, in: *Lars Binckebanck* (ed.), *Verkaufen nach der Krise*, Wiesbaden 2011.

⁹ *Howard Gardner*, Inteligência: um conceito reformulado. Rio de Janeiro 2000. *Tárik de Athayde Prata*, O que há de reducionismo no naturalismo biológico de Searle? *Revista de Filosofia Aurora*. Curitiba: PUCPR, vol. 27 (2015), no. 42, 875–894.

¹⁰ In the West and among a good part of the Brazilian historical Evangelic Churches, there is still an excessive perception of the preaching listener, which unilaterally values, the cognitive, rational, and mental aspects of the hearing.

be associated with experiences in which a narrative can mediate deep comfort and support; or hearing the blessing might, in fact, uplift the listener. Thus, it is helpful to understand how people hear and perceive preaching, how sensory impressions, narratives, or good humor triggers a whole network of neuronal activities and synapses. Therefore, any preacher would do well to pay attention to the perspectives that neurosciences open to the process of the Gospel's communication.

2. How does the one listening to preaching receive a message through the sensory system?

Preaching reaches out to a person through the senses. The human sensory system works in a hierarchical way. First, the brain tends to consider the information that comes in through the sense of sight as true. The visual system is dominant among sensory systems. Other senses take up the function of confirming the information mediated by the optical system. Only when the optical sensory system is not sufficiently precise are the hearing system (and other senses) actuated.

Of the five human sensory systems, the hearing system's functioning is considered the most simple of all: the sound wave, in air pressure form, reaches the eardrum and causes it to vibrate. The vibration of the eardrum by the ossicles acts like a piston that pushes and pulls the membrane over the oval window. The membrane's movement over the oval window moves the fluid that is inside the cochlea, acting on the basilar membrane, causing the hair cells to move from side to side and, depending on the movement of the cells, a chemical reaction is interpreted by neurons and communicated to the brain. This process of neuronal communication is called synaptic transmission.¹¹

Synaptic transmission in the nervous system of an adult human being, as a general rule, is attained through a chemical process that is quite complex.¹² Basically, the synapse cycle consists of a) neurotransmitters present in the synaptic vesicles, b) a stimulus that causes the neurotransmitters to leak into the synaptic cleft, c) a postsynaptic neuron, capable of receiving the neurotransmitter and producing an electrical response or adequate chemistry and d) a mechanism to remove the neurotransmitter from the synaptic cleft to "zero out" the cycle. This entire cycle must take place very quickly.¹³

¹¹ Mark F. Bear/Barry W. Connors/Michael A. Paradiso, *Neurociências – Desvendando o sistema nervosa*, Porto Alegre 2008, 347.

¹² In addition to chemical synapses, there are also electrical synapses, that is, the communication from one neuron to the other takes place through an electric current; cf. *ibid.* 104.

¹³ *Ibid.*, 104–109.

To simplify, depending on their function, we can classify neurotransmitters as “excitatory” and “inhibitors.” Among the dozens of neurotransmitters discovered so far, we highlight some already consolidated in academic research:¹⁴

1. Acetylcholine (ACh): Acetylcholine was the first neurotransmitter discovered. This neurotransmitter is associated with muscle contractions and movements. However, acetylcholine also acts as a neurotransmitter responsible for learning and memory. Acetylcholine is released during the period of deep sleep.¹⁵
2. Serotonin (5HT). Serotonin is attributed to acting on the cardiovascular system and, in the background, also on the respiratory system. Serotonin is responsible for regulating sleep (especially sleep latency, the time it takes to fall asleep), humor (including aggressive behavior), appetite, libido, behavior inhibitor (reduced level of serotonin in the brain has been associated with suicide), regulates sensitivity to pain and performs thermal control of the body.¹⁶
3. Dopamine (DA). Dopamine is responsible for feelings of pleasure, satisfaction, and motivation. The neurons that produce and release dopamine are responsible for regulating movement, regulating and controlling emotional behavior, and acting on functions associated with memory, emotion, anxiety, and planning.¹⁷
4. Noradrenaline (NA). Noradrenaline is related to physical and/or mental arousal and is also associated with good humor. The release of noradrenaline facilitates attention and alertness during the day. Conversely, during the hours of sleep, noradrenaline levels are reduced.¹⁸
5. Adrenaline. Adrenaline is a neurotransmitter that stimulates muscles to react to stressful situations. Adrenaline affects heartbeat, dilation of bronchi and pupils, the release of sweat, etc. – as a response to some threatening stimulus.¹⁹
6. Gamma Amino Butyric Acid (GABA). It is the main inhibitory neurotransmitter of the brain synapses.²⁰

¹⁴ Bryan Kolb/Ian Whishaw, *Neuropsicologia humana*, Buenos Aires 2006, 106.

¹⁵ Simone Bittencourt, *Neuromoduladores e neurotransmissores*. Disponível em: http://www.neurofisiologia.unifesp.br/neuromoduladores_nocaogeral_simonebittencourt.pdf. Acesso em: 09 nov. 2018.

¹⁶ Ibid.

¹⁷ Ibid.

¹⁸ Ibid.

¹⁹ Ibid.

²⁰ Ibid.

7. Glutamate (Glu) and Aspartate (Asp). Glutamate and Aspartate are the main excitatory neurotransmitters in the Central Nervous System. The role of glutamate is fundamental in the memory process.²¹
8. Neuropeptides. There is a wide variety of peptide neurotransmitters. Peptides are released in lesser quantities and generally in conjunction with other neurotransmitters, in order to modulate or influence classic neurotransmission. Neuropeptides, for example, act on the inhibition of pain or, create feelings of euphoria and happiness.²²

Through the produced synapses from impulses in the hearing system, it is possible to distinguish objects or phenomena that are often not identified through other senses. By hearing we can distinguish the voice of a friend, for example. Hearing also allows us to acquire a language. It is fundamental to our communication.²³ Not only that, in addition to helping human beings performing utilitarian functions of communication and survival, hearing has evolved to enable us to explore the sensations and emotions produced by sound.²⁴

3. How does the one listening to preaching process a message through the limbic system?

The communication of a message is perceived by the sensory systems. But, before the message is consolidated and memorized, it is processed by the limbic system – the circuit of emotions. In a figurative language, the processing of a message corresponds to a filter function. It is as if the limbic system filtered all the information received from the outside world and “wrapped” the information with feelings.

Many studies have been carried out to understand and comprehend the relationship between sensory perception, emotion, and subsequent action. Scholars locate in the limbic system – the neuronal circuit related to emotions, feelings such as joy and sadness,²⁵ anger,²⁶ stress or FFF

²¹ Ibid.

²² Ibid.

²³ *Bear/Connors/Paradiso* (note 11), 344–347.

²⁴ For example, musicians explore sound to thrill and generate sensations. Cf. *Johannes Block*, Die Predigt als Hör-Ereignis. Zur Erfahrung von Musik als hermeneutische Schule der Homiletik, in: *Zeitschrift für Theologie und Kirche* 107 (2010), 532–549.

²⁵ Joy and sadness involve dopaminergic neurons.

²⁶ Anger involves the amygdala and regions of the hypothalamus. Cf. *Bear/Connors/Paradiso* (note 11), 577.

responses,²⁷ empathy,²⁸ pleasure and reward,²⁹ or fear.³⁰ Many responses in the body are actually autonomous responses; others are cognitive.³¹

It is likely that science will be able, more and more, to understand and explain the biological aspects associated with emotion. But it is very unlikely that science will be able to define what emotion is. It seems that this will remain a fundamentally philosophical question.

Despite the validity of neuroscience looking for physical-biological correlations responsible for feelings and emotions, we agree with Bear, Connors, and Paradiso that the plasticity and network character of the brain makes it such that the various parts of the brain influence each other. Therefore, we prefer to speak of a system of emotions rather than a limbic system. To advocate for the networked system of emotions suggests that there are no morphofunctional regulatory components in the brain, that is, all the elements involved have similar regulatory functions. Systems actually depend on the integration of their components in a complex, non-hierarchical way. In the system of emotions, therefore, although there is a clear and precise definition of the neuronal circuits that compose it, in the final analysis it works in a network—in an integrated way.³² In fact, the environment is responsible for different developments of emotions in the brain.³³

²⁷ FFF = The fight-flight-freeze response. When an environment is perceived as “safe”, the body activates inhibitory mechanisms on the structures that control the fight-flight behavior. And, when the environment is perceived as threatening, the amygdala is in charge of triggering excitatory stimuli on the autonomic nervous system, in order to generate a protective reaction, Cf. *Joachim Bauer*, *Das Gedächtnis des Körpers. Wie Beziehungen und Lebensstile unsere Gene steuern*, Frankfurt am Main 2015, 24ff.

²⁸ In the 1990s, a group of Italian neurobiologists discovered, at random, what we now call the mirror neuron. Mirror neurons play a crucial role in the field of human behavior. They allow one person to imitate another, regardless of memory, often unconsciously. They also allow the recognition of the intention of an action, its social meaning, including the interpretation of aspects of non-verbal communication. Cf. *Marcia Alves Tassinari/Wagner Teixeira Durange*, *Experiência Empática: da neurociência à espiritualidade. Revista da Abordagem Gestáltica: Phenomenological Studies*, vol. 20, no. 1, 53–60, 2014. *Giacomo Rizzolatti/Laila Craighero*, The mirror-neuron system. *Annual Review of Neuroscience*, v. 27, 169–192, 2004.

²⁹ Dopamine, as a neurotransmitter, seems to play a fundamental role in mediating the feeling of pleasure and reward. Cf. *Manfred Spitzer*, *Schule der Zukunft – Hirnforscher Vortrag in Feldbach*. Disponível em: <https://youtu.be/NR-KPZEL3Aw>. Acesso em: 01 jun 2017.

³⁰ Probably due to the need for survival, the brain developed the ability to record and memorize negative experiences with greater speed and intensity. The amygdala and hypothalamus are the regions of the brain where feelings of fear and anger are produced. Cf. *Bear/Connors/Paradiso* (note 11), 573ff.

³¹ *Vanderson Esperidiao-Antonio* et al. Neurobiology of the emotions. *Rev. psiquiatr. clín.*, São Paulo, vol. 35, no. 2, 2008, 56.

³² *Ramon Cosenza*, *Fundamentos de neuroanatomia*, Rio de Janeiro 42013.

³³ *Bear/Connors/Paradiso* (note 11) 571.

4. How does the one listening to preaching entrench a message through the cognitive system?

A message that is perceived by the sensory system and processed and “wrapped” by the system of emotions is able to be consolidated and recorded in the brain as a memory and as a learning experience.³⁴ It is necessary to develop skills so that learning happens. The acquisition of skills is essential so that new information and information that is already recorded in memory be placed in dialogue and provide new synapses, associations, and learning.³⁵ When a link is established in the brain between new information and pre-existing information in memory, neurotransmitter substances such as acetylcholine and dopamine are released by the brain, which improves concentration and generates pleasure and satisfaction.³⁶ One of the biggest mistakes that occupies popular imagination is the idea that today it is no longer necessary to dedicate yourself to learning something. All the necessary information is available on the internet. But, it is an illusion to think that the brain consolidates learning by the “just in time” paradigm,³⁷ to think that all information is in the cloud and, when necessary, is accessed. There is no knowledge on the internet, only information. Knowledge is only in the brain and it is dependent on connections and synapses. The brain does not download. Only when the brain is exercised does it create new synapses. When the brain is not stimulated, it saves energy. The routine is designed precisely to save energy.³⁸

Further, emotions are directly involved in the process of consolidating a message. Depending on the type of emotion that the interaction with the environment provokes and the diversity of stimuli that the listener of the sermon receives, emotions can favor or hinder the communication process.³⁹ As said previously, emotions affect the consolidation of a message and impact learning, both in a way that favors it and harms it. Anxiety and prolonged stress, for example, have a devastating effect on learning. Under prolonged stress, “the glucocorticoid hormones secreted by the adrenal gland act on the neurons of the hippocampus [memory area], even destroying them.”⁴⁰

³⁴ Tatiana M. Dorneles, *As bases neuropsicológicas da emoção. Um diálogo acerca da aprendizagem*. Licenciatura. Ivo, vol. 2, no. 2, 14–21, 2014.

³⁵ Spitzer (note 29).

³⁶ Dorneles (note 34), 18.

³⁷ “Just in time” is an administrative philosophy derived from the automobile industry (Toyota) in which production must be carried out in the right quantity and at the right time. In the assembly line of a product, all the inputs are reached at the exact moment they become necessary, avoiding the agglomeration of unnecessary stocks and raw materials. Cf. Jeffrey K. Liker, *O modelo Toyota: 14 princípios de gestão do maior fabricante do mundo*, Porto Alegre 2005.

³⁸ Spitzer (note 29).

³⁹ Dorneles (note 34), 14–21.

⁴⁰ Cosenza/Guerra (note 6), 84; Bauer (note 27), 24–34.

Also considering the process of consolidating a message, Gerhard Roth⁴¹ demonstrated that the adult human being is not able to assimilate new learning, in a concentrated way, for more than five minutes. After that time, the information needs to be consolidated in the brain (recorded); otherwise, new information simply replaces the first, which is then forgotten. And, the privileged way for the brain to consolidate and “record” information is through emotions. The brain consolidates a message when learning is related to emotions. Unfortunately, information associated with negative emotions is recorded much more quickly than information with positive emotions.⁴²

Finally, regarding the consolidation of a message by the brain, we need to highlight that this consolidation does not happen as a mechanical biochemical process. Quite the opposite, a message is consolidated in different ways depending on the context from which it is communicated. Every preaching event presupposes a context. In these contexts, emotions and relationships are inserted. Emotions and relationships are part of life from the moment of birth until the end of the life cycle. Throughout this period the subject is constituted and constitutes other subjects. Human beings depend and need to relate. Without a relationship with the other they languish and die. So too, when there are no relationships the human brain does not develop but languishes. Neurological research shows that the brain works in a network form. Nothing works in isolation, independently. Neurons are all related. The human being’s cognitive and emotional potential develops in relationship with the other. Only in relationships do human beings develop an identity.

Therefore, the less intense the neuronal activity, the less likely there will be new neuronal connections and synapses. From the perspective of neuroscience, the preacher’s goal should be to stimulate neuronal activity, to stimulate the creation of synapses, because in this way the message is better consolidated. Hence the importance of creating mental images.⁴³ The images are constituted in the brain from the senses. It is interesting to note that the senses do not work in isolation in the brain. Quite the opposite, each sense derives part of its information from the other senses. For example, hearing derives around 25% of the information from the other senses. The good news is that, from the perspective of neuroscience, good preaching is capable of generating much more neuronal activity (when the brain produces images) than a film, for example, where images are abundant but ever present and built for the viewer. In good preaching, the listener is able to “see with the ears.”⁴⁴

⁴¹ Cf. *Gerhard Roth*, *Wie einzigartig ist der Mensch? Die lange Evolution der Gehirne und des Geistes*, Heidelberg 2010.

⁴² *Antônio Damasio*, *O erro de Descartes. Emoção, razão e o cérebro humano*, São Paulo 1996.

⁴³ *Júlio César Adam*, *Um Deus com o rosto do Brasil: um estudo exploratório sobre a relação entre imagens e imaginários de Deus na cultura e na pregação evangélico-luterana*. Horizonte. Belo Horizonte: PUC Minas, vol. 14, no. 44, 2016.

⁴⁴ *Walther von La Roche/Axel Buchholz*, *Radio-Journalismus. Ein Handbuch für die Ausbildung und Praxis im Hörfunk*, Berlin 2009.

Summation: We try to describe the process of hearing from the perspective of neuroscience. Relevant to the scope of our article, the process of listening does not reside exclusively in biological properties – as important as these are – but in the Limbic System, the System of Emotions. All information captured by the Sensory System goes through the Emotions System that works as a kind of filter and will give a point, a meaning to the information, enabling memory and learning, that is, the consolidation of the message. In the same way, if we ask how the listener of the sermon listens, the answer is directly associated with synapses. Quality listening presupposes the consolidation of synapses. And, when synapses are consolidated in the brain, the brain produces memory. Only from memory is it possible to learn and grow cognitively. In the last part of this article, we want to derive the implications of neuroscience for homiletics.

5. Listening to preaching fertilized by neuroscience

How can neuroscience fertilize the preaching, specifically the process of listening to a preacher?

5.1 A preaching that surprises listeners

One of the great impulses to put the human being in motion is the feeling of reward, the feeling that the effort was worth it. In every personal undertaking, it is necessary to find a balance between the risk to be taken and the security of life itself. From then on, the brain pours large amounts of dopamine into the bloodstream. If there were not this feeling of satisfaction, of reward, the human being likely would not be willing to act, and would not take risks. In addition to meeting their basic needs, the human being is able to aim for higher “rewards.” In doing so, for example, the human being seeks money, power, the beauty of the body, the victory of his football team, art, a cozy atmosphere, and—if we are to make a connection with the worship service—captivating preaching, as a form of reward. The human being is able to categorize everything through a reward scheme, including preaching. Preaching can trigger feelings of reward, of pleasure. The same happens when listening to preaching; it can generate joy.⁴⁵ Preaching can generate a feeling of gratification when it surprises and when connects the text with life in a way that does not just say the obvious. As we saw earlier, the brain categorizes as relevant to life only what is activated by the conscious of the brain and evaluated by its emotional charge to then become a synapse and long-term memory. In

⁴⁵ In this context, it is possible to understand why preachers who use humor in their sermons, easily captivate listeners. The fact is that, from the perspective of neuroscience, humor activates several regions in the brain. The listener will laugh and rejoice, creating sympathy for the preacher and, at the same time, confidence in what he says. In our understanding, a Brazilian preacher who uses humor extensively in his preaching is Pastor *Cláudio Duarte*, easily accessible on many links on youtube.

this case, on the one hand, the listener of preaching is curious. On the other hand, the brain easily accommodates when something sounds boring. In this case, it tends to ritual, repetition, and routine.⁴⁶

If we consider that through preaching we want to reach the listener with a message, and we want the message to be recorded and consolidated in the listener's life, dopamine plays an important role. When dopamine is blocked in the brain, learning is impaired. Therefore, when listeners are underloaded or overloaded with demands, they do not learn properly, since feelings of reward have not been generated or have been suppressed. As we have seen, when the brain “gets the impression” that the effort it takes to learn is not worth it, it simply does nothing. But when the brain “delights” and the message in preaching is given an emotional charge, dopamine is discharged into the bloodstream and learning can be more effectively accomplished. Dopaminergic neurons are stimulated when the feeling of reward is “better than expected.” This behavior of neurons could explain why the human being always looks for more and intense sensations of reward and is not satisfied with what they already have.⁴⁷

Thinking about the listener of preaching could highlight the relevance of a dialogue between neuroscience and theology: They both know something of the inherent feeling in the human being who always seeks more intense experiences of pleasure and reward and never seems to be satisfied.⁴⁸ Since only “better than expected” experiences are capable of generating dopaminergic discharge, there is no point in preaching with a moral appeal to the reason of the listener.

Jesus told the parables of the lost coin, the lost sheep, and the “lost” sons.⁴⁹ They are narratives that portray the joy of finding something that has been lost: the shepherd's sheep, the woman's coin, the son who returns home. This indescribable joy, which simultaneously describes the joy in heaven for a sinner who repents, is, from the perspective of neuroscience, a narrative that describes a discharge of dopamine by the brain in the bloodstream. The man and the woman are rewarded for their effort to look for what had been lost; the father sees his waiting time rewarded and everyone celebrates the achievement with friendly people. Jesus preached to his listeners in such a captivating way that they always wanted to hear more. This experience for some who were listeners to Jesus led to a radical change in life. These listeners abandoned their safe life in favor of an itinerant life, becoming Jesus' first disciples and finding meaning in their lives.⁵⁰

⁴⁶ Behavior assumed by the brain to save energy.

⁴⁷ *Angela Rinn*, *Die Kurze Form der Predigt*, Göttingen 2016, 82.

⁴⁸ Gen 11 :1–9 (Torre de Babel); Ex 16 (Reclamação dos israelitas no deserto. Deus envia codornizes e o maná) ilustram o aspecto da insaciabilidade do ser humano.

⁴⁹ Luke 15.

⁵⁰ *Rinn* (note 47), 83.

The role of humor in preaching has already been mentioned. We can understand why many preachers like to start their sermon or lecture with a humorous story. Humor captivates and fosters empathy with the preacher. Peter Lampe provides us with an example of how Jesus inserted the surprise factor and the use of humor in some of his parables. For example, in the parable of the yeast that a woman mixed with wheat, the immense amount of wheat used by the woman draws the attention of the listeners: around 176 lbs! If we consider that in Jesus' time families made their own bread, the amount of flour used must have been stunning. The second surprise stems from the fact that Jesus compared leaven and wheat with the action of the Kingdom of God in the world. Perhaps Jesus' listeners had never heard of such an association. Jesus's message certainly generated astonishment and laughter.⁵¹ Jesus has the ability, in a sentence, to fascinate his listeners through humorous narratives that move and surprise them. He tells the narratives in such a way as to arouse curiosity, the desire to hear and experience more, to learn.

In this way, preachers have the potential to cause dopamine release in the listener. By hearing preaching, large areas of the brain are activated. The listener creates mental images. If there is an element of surprise in the preaching, dopamine is released. The opposite also happens: when the preacher does not create expectations or when the preacher anticipates the resolution of the problem, dopamine is not poured on the listener. Would it be possible for preachers to avoid generalizations in preaching? As much as the expression "God loves you" has a profound theological and existential meaning, the phrase is likely to have little effect on listeners who have heard it for the nth time. Through the lens of neuroscience, even if a preacher has an excellent exegesis, it can be lost when the elements of surprise or expectation are not inserted into the communication of the message. At best, listeners of the preaching should receive the preacher with expectation, looking for preaching that involves them in many ways: spiritually, intellectually, corporeally, and ethically.⁵² Finally, we emphasize what we have already stated: the feeling of pleasure and reward results from the activation of dopaminergic neurons in the nucleus accumbens. But we still want to emphasize that in conditions of deprivation the release of dopamine is greater. That is, when people live in deprivation—in any sense—a small gesture, a simple action is capable of generating a discharge of dopamine. Christian preaching could consider the fact that for many people around the world, listening to preaching is not obvious. Because of totalitarian regimes, there is no religious freedom, and listening to a preacher becomes something to be looked forward to. This fact should lead Christians who live in an environment of religious freedom to evaluate the way they live their spirituality. With what expectations do they participate in the service, with

⁵¹ Peter Lampe, *Die Wirklichkeit als Bild*. Neukirchen-Vluyn 2006, 155 cited by: Rinn (note 47), 83.

⁵² Rinn (note 47), 84.

what expectations do they exercise the spiritual disciplines (prayer, Bible reading, communion, fasting, etc.).

5.2 A preaching of the mutuality

Neuroscience points to what the Christian tradition has long asserted: human beings acquire their identity from relationships. They are relational beings. From a theological perspective, human beings are created in the image and likeness of God and designated as *Gegenüber Gottes*.⁵³ Trinitarian communion is paradigmatic for Christian communion.⁵⁴ Human beings can only exist as interlocutors, they “atrophy” when isolated. Human beings depend on other human beings to develop; develop language, for example. This occurs because the brain develops its potential when stimulated from external impulses.

Therefore, in a strict sense, the brain does not develop; quite the opposite, it loses its potential if it is not stimulated. For example, any child who was born in a healthy way is able to learn any language spoken in the world as their native language. It all depends on the language she hears from her interlocutors. Cognitive and emotional potentialities develop from relationships, from mutuality.⁵⁵ “People learn what they are and who they are in the social and cultural communion to which they belong. This includes the religious context in which they grow up.”⁵⁶

A person’s social and relational identity can be developed through narratives, stories told in the social group to whom the listener of the preaching belongs. Through narratives, social competencies are mediated, such as the competence to put yourself in the place of other people. Another derivation in neuroscience for homiletics consists in the discovery that hearing narratives activates a vast network of neurons in the brain. A study conducted by medical researchers at the University of São Paulo (USP) researched the areas of the brain that are activated at the moment the respondent is confronted with narratives that refer to joy, irritation, sadness, anxiety, and fear. The researchers noted that the feeling of joy activated more areas in the prefrontal and subcortical regions than the other analyzed feelings. The researchers also found that the various feelings surveyed activated a variety of areas, demonstrating the concept of network and interdependence with which the brain works.⁵⁷

⁵³ Christina Aus der Au, *Körper Leib Seele Geist. Schlüsselbegriffe einer aktuellen Debatte*, Zürich 2008, 186–238.

⁵⁴ Ricardo Barbosa, *O caminho do coração: ensaios sobre a trindade e a espiritualidade crista*, Curitiba 1998.

⁵⁵ Marcus David Ziemann, *Relacionamentos interpessoais: a relevância da mutualidade bíblica para a edificação de uma comunidade cristã*, São Bento do Sul: FLT, 2009.

⁵⁶ Rinn (note 47), 87.

⁵⁷ Jorge Almeida et al., Engagement of multifocal neural circuits during recall of autobiographical happy events. *Brazilian journal of medical and biological research* = *Braz J Med Biol Res*, Ribeirão Preto, vol. 41, no. 12, 1076–1085, 2008.

Contextualizing dialogue between neuroscience and homiletics, it is relevant information for preaching that from the perspective of neuroscience listeners only survive as human beings in an environment of relationships. And, only from relationships are they able to develop competencies such as speech. Living in a community, in relationships, is not a matter of personal decision but a matter of survival. The theological premise is that the Christian is not able to live their faith in isolation, but in an interdependent and mutual way. That is, only as an interlocutor before God and his fellow human beings can the Christian find a full life – a fact also legitimized by neuroscience. How, then, can the listener of the preaching be encouraged to live in a context of communion? A significant contribution can be made by preaching narratively.

When Jesus told his parables his listeners learned something about their relationship with themselves, with their neighbors, and with God. When Jesus spoke in his narratives of joyful events (party, wedding, finding a lost coin, finding a lost sheep, finding a treasure in the field, or the precious pearl), the narratives evoked positive memories and many regions in the brain were activated in his listeners. And, very importantly, Jesus connected positive memories with the Kingdom of God! Finally, the principle of mutuality in preaching also raises a question for the preacher and their relationship with listeners. We will see more details about the person of the preacher in the next section.⁵⁸

5.3 An empathic preaching

Feelings and emotions, as a rule, make communication between people possible and favorable. But, feelings and emotions can also eventually harm communication. Feelings, so to speak, constitute a preparation of the organism to interact and communicate with the environment. A very important feeling for establishing contact and dialogue is the feeling of empathy. As seen earlier, empathy is made possible by the fact that in the brain there is a Mirror Neuron System, which allows someone to put themselves in the other's place, at the point of acting and feeling like the other. "We use cortical representations, which encode our own motor system, to simulate the action of another person in our brain and, in this way, in advance to understand the intention of the other: we reflect others in ourselves."⁵⁹ From a neuroscience perspective, the feeling of empathy is vital to relationships. It formats and consolidates relationships. However, empathy can be activated with different forms and intensities, and can even be blocked. A fundamental factor – perhaps the most important, related to the ability to demonstrate empathy is trust.

⁵⁸ Rinn (note 47), 89–91.

⁵⁹ Ibid, 92.

In adults, trust is a much more comprehensive factor, [than in children] in the sense of mediating criteria to assess whether a person is worthy of empathy and help. It is not enough to know personally. As some experiments show, the best chances of receiving help and empathy are those who belong to the same group: people from the same family, who have the same religion, the same values and share the same opinions; speak the same language, and belong to the same ethnic group. All of these factors help to establish a degree of reliability, to guarantee, that they will not be exploited. But if the person who needs help and empathy is someone strange, geographically distant, someone, who only knows himself through the media, it may even happen that the appeal causes an empathic reaction, but the impulse is weak and easy to suppress. A very effective method, used by adults to suppress impulses of empathy, is rationalization. For example, the person rationalizes and comes to the conclusion that the other person is to blame for his situation and therefore does not deserve help.⁶⁰

The feeling of empathy is blocked when trust is betrayed and the rules of the social group have not been observed. There will be no expression of empathy if someone goes through difficulties or has been punished for the fact that he supposedly broke the rules of the social contract. In this case, empathy can be expressed in its opposite: cruelty, evil, and violence.⁶¹

By focusing specifically on the listener of the preaching, empathy as a neuronal phenomenon can help the listener and the preacher to establish links. For the preacher, it is evident that preaching with a moralistic appeal is unlikely to motivate listeners in the right way to experience faith in love and service. And listeners of preaching have the opportunity to understand, from neuroscience impulses, why they are sometimes not as empathic as they would like to be. The decision for an action resulting from empathy is made in a fraction of a second and, depending on the values that the listener has, a lack of confidence or a rationalization can suppress the feeling of empathy and the action derived from it. Also in the context of religious tolerance, the discoveries of neuroscience can bring helpful impulses to the Christian community, which as a cohesive social group with feelings of belonging, can be led to evaluate its values and reflect upon the possibility of opening up to the other.⁶²

5.4 The listener in a context

About the brain, research indicates that its development occurs from two fronts. The first is biological, where genes occupy a prominent place. Early stages of development are strongly affected by genetic factors; for example, genes direct newly formed neurons to their correct

⁶⁰ *Doris Bischof-Köhler*, Empathie, Mitgefühl und Grausamkeit. Und wie sie zusammenhängen, in: *Psychotherapie* vol. 14 (2009), no. 1, 52–57, 56.

⁶¹ *Ibid.*, 56f.

⁶² *Rinn* (note 47), 95.

locations in the brain and play a role in how they interact.⁶³ However, despite the fact that genes organize the basic structure of the brain, they do not project the brain's development completely. Instead, genes allow the brain to adapt according to the impulses it receives from sensory systems. This is the second front involved in the development of the brain. The plasticity of the brain is amazing so that the environment acts on its formation. A child's senses report to the brain about his environment and experiences and stimulate neural activity. Speech sounds, for example, stimulate activity in brain regions related to language. If the number increases (more voices are heard), synapses between neurons in that area will be activated more frequently. And repeated use strengthens a synapse. Synapses that are rarely used remain weak and are more likely to be eliminated later. The strength of synapses contributes to the connectivity and efficiency of networks that support learning, memory, and other cognitive skills. Therefore, a child's experiences not only determine what information enters his brain but also influence how the brain processes information. In summary: genes provide a model for the brain, but the person's environment and experiences carry out their construction.⁶⁴

From this analysis, neuroscience offers clear implications for thinking about how one listens to preaching. The communication of the Gospel takes place when preaching is pronounced. However, we can be sure that preaching is not the only moment when the listener appropriates the Gospel. Preaching always occurs within a context. The environment in which preaching is delivered impacts and acts upon the listener, sometimes in order to favor and underline the uttered word and sometimes to create noise for the listener. From the perspective of neuroscience, context is as important for the communication of the Gospel as the preaching itself. The context of the preaching (liturgy) should observe three criteria: listeners need to understand, then connect, and finally develop the context of the preaching.⁶⁵ The whole context that involves the listener—the environment, songs, prayers, Bible readings, confessions of sin and faith, the Lord's supper, the blessing and sending, offerings, and the preaching itself—could be molded from the three mentioned criteria: does the listener understand symbolic communication? Does what is said in the context of the preaching connect with the listener? How can a preacher mold, prepare, and develop a context (or a frame) for preaching so that preaching's purpose is achieved?

⁶³ *Michael Rutter*, Nature, Nurture, and Development. From Evangelism through Science toward Policy and Practice, in: *Child Development*, vol. 73 (2002), no. 1, 1–21.

⁶⁴ *Maturana* and *Varela* provide an interesting example when describing an experiment done with a newborn lamb that is separated from its mother for a few hours and then returned to its mother. Apparently the lamb develops normally, but when observing its interaction with the other lambs, it is noticed that it does not play, it remains remote and lonely. Neuroscience is still unable to give a detailed answer, but it is certain that the environment influenced the development of its neuronal structure. In fact, during the first hours, mothers continuously lick the lambs all over the body. The deprivation of this maternal stimulus changed the lamb's behavior. Cf. *Humberto Maturana/Francisco Varela*, *A árvore do conhecimento: as bases biológicas da compreensão humana*, São Paulo 2001, 142–143.171–196.

⁶⁵ *Klaus Douglass*, *Celebrando o amor de Deus*, Curitiba 2000, 43.

5.5 The listener builds images

All information perceived by the sensory system is processed by the brain through electrical or chemical synapses. Synapses trigger motor or cognitive responses, for example. It is important to highlight the enormous synaptic potential that hearing is capable of generating in the brain, due to the fact that hearing enables the construction of mental images. Building mental images in the listener of preaching is a great challenge for homiletics. How could the preacher communicate the Gospel so that while the message is heard a network of neurons are activated, forming synapses from mental images? How does one communicate so that the listener experiences what they hear? How does one develop the theme of preaching so that the listener “sees with their ears”?

Preaching is best understood when the message content is combined with sensory impressions. The preacher connects with sensory perceptions of hearing, which in turn stimulate other areas of the brain, such as the limbic system, which is accessed and activated. Preaching can offer a path. Through preaching in narrative form, images are evoked in the mind of the listener. The images activate the synaptic system so that many areas of the brain are activated. If we compare the synaptic stimulus produced by a preacher in narrative form with a film, for example, narrative preaching has the advantage of producing much more neuronal activity than film. This is due to the fact that the narrative acoustically accesses the brain. The listener hears one part or scene after another, having to mentally create and construct the images, in order to form the plot. In film, the images come readily; the film does not encourage the creation and construction of mental images. Therefore, listening to a preaching narrative can be highly meaningful, captivating, and interesting. The construction of mental images is one of the reasons why many people prefer to read a book rather than watch the film adaptation.

5.6 Preaching that thrills the listeners

Without neglecting the rational and logical dimension of preaching, it is important that the emotions are considered by the preacher, because from the perspective of neuroscience the listeners of preaching will be especially attentive when their emotions are involved.⁶⁶ “The brain likes to be flattered; it is dependent and needy.”⁶⁷ Preaching could be mobilized to foster positive emotions—joy, enthusiasm, curiosity, gratification—and to ponder the need for language that evokes

⁶⁶ In this case, the limbic system, especially the amygdala and hippocampus, is activated in the brain. *Robson Marinho* points out that around 40% of listeners have an emotional profile, that is, they like and prefer to listen to sermons with a strong emotional appeal. Cf. *Robson Marinho*, *The art of preaching*, São Paulo 1999, 36.

⁶⁷ *Dorneles* (note 34).

feelings such as fear, apathy, and frustration.⁶⁸ We imagine preaching that is pleasant to hear and communicates worth-while perceptions to the listener.

Whoever preaches, triggers emotional states resulting from experiences, memories, context, and the environment in their listeners that permeate both the emotional state of the preacher and the listeners. The experiences of the preacher and the listeners of preaching have a remarkable influence upon intensity, meaning, and decision making. This human inter-relationship builds identity as new insights are acquired in relationships.⁶⁹ Formation of identity and the emotions make sense when the listeners of the preaching are children and adolescents. It is necessary for preachers to remember when faced with children and adolescents, that they are taking part in “the formation of subjects who are forming their prefrontal cortex, their identity, their learning, their memories, and the emotion that is triggered by one or the other can be a determining factor.”⁷⁰ The preacher’s interaction with the child audience generates emotions that “affect attention, the evocation of memories or even generate negative or positive memories for future evocations.”⁷¹ The relationship between preacher and listeners can be motivating, so the listener needs to accept the person of the preacher before accepting the message. The listener should not be afraid of the preacher but have a pleasant experience.

For an engagement of the listener, the first few minutes of preaching is the decisive moment. When the listener’s curiosity is aroused at the beginning of preaching, when their emotions are involved, the probability of the message being recorded is increased. Relevant in this context of memory is also repetition, emphasizing what you need and want to stand out.

6. Conclusion

Our attempt was to understand the possible impact of neuroscience on the homiletical task—on preaching. We tried to verify how neuroscience could help preaching, always having the listener as a transversal axis of our analysis. First, from the perspective of neuroscience the brain is activated through preaching that surprises the listener. A sense of surprise is generated when an expectation is created, when a feeling of reward is offered, or when the listener perceives mutuality. Second, because the brain functions as a system of mirror neurons, preaching that engages the principle of interdependence can enable the listener of preaching to grow in empathy and acts of mercy. Third, as neuroscience shows the ways that context shapes the development of the brain, so preaching

⁶⁸ *Cosenza/Guerra* (note 6), 84.

⁶⁹ *Dorneles* (note 34), 18.

⁷⁰ *Ibid.*, 19.

⁷¹ *Ibid.*

should be understood as that which occurs within symbolic contexts. Fourth, neuroscience details important insights for preaching about the hearing system, which provides the listener with the possibility of constructing mental images capable of recording themselves deeply in memory. Finally, neuroscientific reflection around the limbic system – the system of emotions – demonstrates the importance of positive emotions and feelings in preaching. These feelings enable memories to exercise their creative and transforming function in the listener. With these five observations, we hope that this article will encourage significant impulses within homiletical research while also inspiring preachers in their task of communicating the Gospel.

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