

Writing through the Lens of Anthropology and Neurosciences

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ABSTRACT

Anthropology and neuroscience are two independent scientific fields that study learning, respectively, and writing as part of it as an activity in the broad sociocultural context. Anthropology directs interest to the social and cultural dimensions of the writing process. Neuroscience views learning through writing as dynamic multisensory processes related to the functioning of neural networks. The processing of information acquired in experience and its memory storage defines the neuroscience discourse in the research writing process. The purpose of the paper presented here is to attempt to connect the perspectives of anthropology and neuroscience and to develop the hypothesis of possible research on writing through a mixed-methods design.

In the first part of the paper, an anthropological qualitative study conducted in a Bulgarian compulsory education school will be presented. Its purpose is to describe how the teacher's actions influence the students' identity in the writing process. Using photographs representing fragments of one lesson conducted in a mother tongue (Bulgarian language), I will analyze the interaction between the teacher and the students, who write simultaneously. The study clearly shows how pupil's actions correspond with the identity of their teacher during the work. This inquiry is significant because teachers undoubtedly have a lasting effect on the learning behavior and outcomes of pupils. In the second part of the presentation, I will present data from scientific journal publications that describe the neurophysiological indicators measuring the writing process. They are a complex code that marks the inner reactions that happen in students' brains. Thankfully, of these markers, we can suppose how teaching should be adapted according to students' information processing style.

In conclusion, I will try to explain how connecting the epistemology of qualitative research which is socially and content-oriented – from one side and neuroscience's approach to synaptic plasticity as the biological basis for learning – from the other side, could deepen research on writing in the broad social context. Using a mixed-methods design would contribute to the study of writing at a social and biological level. This will expand the possibilities for improving teaching in pedagogical practice.

Keywords

Neuroscience, Anthropology, Research.

Introduction

Anthropology and neuroscience are two relatively separate scientific fields, each with its focus on research. Since its inception, anthropology has been following the historical roots of human development, trying to establish how the geographical environment affects humans and, in later stages of its existence, examining the influence of the group on the individual and vice versa on the formation of the habitat. Neuroscience is also a separate scientific discipline that directs its interest towards the study of the brain and synapses that allow information to flow through the human body biochemically. Despite its distinctiveness, anthropology and neuroscience have a similarity, which is a prerequisite for discovering new methods, and therefore for creating a new epistemology in human sciences. A careful analysis of the two sciences reveals the following common features in the construction of scientific knowledge:

- anthropology and neuroscience deal with the flow of information: The first in the process of social communication, but also the human mind; neuroscience deepens this interest and directs it to the neuromorphological structures of the visual cortex;
- the two sciences view man in a complex, non-linear way and seek to explain overall behavioral and thought structures: in anthropology, close observation of man, in an almost intimate environment, to observe the details - neuroscience afferents, also to detect distinctive properties of the object world such as color, contour and so on - in both sciences human contact should be made – in the social environment or the laboratory – to test the scientific hypotheses made;
- research is aimed at identifying the specific, which becomes the basis for abstracting the typical, the common, the common, in the next stage of research; the repetition in anthropology leads to the definition of habitat – the repetition in neuroscience – the formulation of patterns in the activation of different areas of the brain;
- details and patterns are equally important for both sciences because the random sighting could become a significant fact for human research.

The 'scene' of the interaction between anthropology and neuroscience is the human body. From one country it is a carrier of individual differences – on the other, it has a common morphological and functional structure defining the type of homo sapiens. The social nature of man predates his body. Behavioral neuroscience is deeply involved in the study of the hypothalamus, the functions of the sympathetic and parasympathetic nervous system, the motivation, and both the short and long-term regulation of behavior; it knows the mechanisms of the brain related to human emotion or nutrition [1]. It explains the biochemical and neural processes through which the human organism interacts with the SAS environment. On the other hand, anthropology uses the metaphor 'organism' to construct its scientific knowledge. The naturalistic direction in it explains the psychological processes of man with the physiology of the human body. But later, the second,

existential-philosophical direction in anthropology began to look axiomatically at the spiritual, symbolic origin of man. As a result of the development of the two sciences today, the body can be considered transdisciplinary.

As a subject of transdisciplinary examination, the body can be considered according to Shusterman due to the logic of the emergence. It manifests in the sudden, unexpected appearance of a new quality of part or whole of the body [2]. The processes of deconstructing or constructing the body through symbolic or mechanical (physiological) actions would make it possible to 'fulfill' scientific concepts with new content. It would, in turn broaden the pragmatic importance of scientific knowledge. The non-reciprocal, somatic, and emotional perception of the human body is a precondition for penetrating the essence of the knowledge embodied in the practice of life and, therefore, for reaching an overall knowledge of man in science in general. In this sense, 'organic' in the body's examination must be understood as a unity of physiological and representative, representing an indivisible whole. This does not mean that the physiological and the spiritual lose their focus. Rather, they manifest themselves as two pulsating poles of the same thing -- the body that combines them into one whole. If we follow the methodological logic of anthropology here, the difference creates an organic whole [3]. Following this logic, in the article below, I will attempt to describe the writing. It is currently being considered dichotomically – as a cultural technique in anthropology and as a multi-sensory process in neuroscience. The question arises as to whether it is possible to replace the discursive reading of writing with holistic thinking about it. The other question relates to the scientific method or methodology by which this hypothesis could be supported. One of the possible answers could be linked to the use of a mixed-method design.

Writing from an anthropology point of view

The interest in writing as a social and cultural practice in anthropology has been relatively recent, since the mid-1980s [4]. The text is a catalyst for action between people and institutions. At the modern stage, in addition to the classical texts with a material medium —paper — electronic media are increasingly important and contribute to the globalization of communication at all levels. That's what makes writing as a social and cultural technique interesting to anthropology.

The specific anthropological point of view of writing is its conception, formulated by Barton & Papen in the following way: 'Its core interest is to examine the processes of production and use of texts' [4]. This understanding is specified by the categories 'literacy practices' and 'event'. Barton & Papen defined the first category as people's earlier approaches to reading and writing in practice, and the second as knowledge that people derive from their life experiences. These categories shall be used for the examination

of writing in the following aspects:

- extension of the discursive analysis of the text, which is limited to the products of writing without considering its use;
- extending the literary tradition of looking only at books created by professional authors – anthropology looks at all types of writing, regardless of the author's profile;
- address the historical approach to the text, which looks at it from a specific social and cultural perspective over some time and focuses on the diversity of genres and practices; anthropology also looks at the practices of writing in modern society;
- the limitations of the educational practice in which writing is considered as learning and teaching a set of skills necessary for the implementation of social communication are overcome; in anthropology, writing is much more than skills acquisition – it is an activity that subjects exhibit [4].

I will then try to give these methodological considerations a more concrete example of my research practice. The image I'm about to analyze is part of my direct observation of a ninth-grade literature class at a general education school. The analysis will be based on subjective and objective ontology. In this sense, my reflections will reflect my impressions of the observed social practice in the classroom; the images of the photography are a manifestation of objective ontology. My reasoning is based on the qualitative research method known as 'grounded theory' [5]. The question of how classroom writing can be interpreted as a social practice is open, i.e. the analysis covers all behavioral acts that can be identified.

The first step might be to establish the following: The photograph (Figure 1) shows a moment in the class of literature, the theme of which is the Writing of the essay. The subjects in it are a teacher and four students. The teacher writes on the board and sits in front of the students, which determines his status as a 'leader'. The students write in their notebooks at the same time as the teacher. They form a group. The written texts can be seen on the board, in the students' notebooks, in the books on the teacher's desk, on the board on the right, and the shopping bag on the left of this picture. The photographic content covers the practices of writing that are typical of a school institution and are part of the daily lives of teachers and students. It shows writing in both the teacher and the students. There are also material artifacts. Pupils and teachers are based on their experience, which allows them to structure the 'space' of their communication. Although brief, photographic analysis illustrates the specificity of anthropological analysis. Social practice markers are the use of part of the body – the hand – to carry out the writing; the existence of a material environment to help carry out the writing; the meaning of the activity as a whole – writing for learning; competence to carry out the writing, both by teacher and pupils.

The photo could identify the habitat in the writing process, but not the innate prerequisites for the demonstrated patterns of brow.

Thanks to genetic research, anthropologists can now make more accurate assumptions about the possible actions of the observed subjects [6]. Of course, children couldn't survive just because of their physical bodies. They must also learn about a culture that is socially constructed and which is to be learned through a variety of interactions with other members of society. It is precisely the linkage between social and biological that is a prerequisite for a deeper human explanation.

Writing From a Neuroscience Point of View

In neuroscience, writing is also a subject of research, but from a different perspective. She's interested in how the brain connects to behavior. On this basis, an explanation of human activity in the Writing process is sought. For neuroscience, writing is a complex peptide process related to motility, the sensory system, balancing, and touching. No less important are emotions before, during, and after writing. Cognitive dimensions related to language, attention, higher cognitive processes, and memory are an essential part of neuroscience research related to writing. To illustrate how they are performed, I will present the content of the article by DiMenichi, Ceceli, Bhanji, Tricomi [7], which refers to the effects of expressive writing on neuronal learning processes.

The first difference, which makes an impression compared to anthropological research, is the approach to selecting the persons involved in it. A behavioral pilot study has been performed and has been shown to have an effect size; the age and size of the money with which participants are externally motivated has been specified. The research task and the means by which it was carried out are then described. The text could further distinguish two groups of concepts: Some familiar to social sciences in the broad sense, and others characteristic only of neuroscience.

The first group include terms, such as: Likert scale, test phase, Resilience Scale, Achievement goal questionnaire, Cognitive inference questionnaire, Social Desirability, survey, word task, group-level differences, control group, general liner model, Monte Carlo simulation, non-parametric test, non-parametric contrasting procedure and so on. The second group includes specific anatomical and physiological terms such as: functional magnetic resonance imaging, anatomical slices, single-shot EPI pulse sequence, ventral prefrontal cortex, high-pass temporal filtering, canonical hemodynamic response function, striatum, mid-cingulate cortex, right occipital gyrus, caudate head, the superior frontal is not another. Compared to anthropology, neuroscience presupposes the mastery of a highly specialized vocabulary, which takes it away from daily experience. The goal of the study is to analyze the entire brain at the time of its activation in the process of expressive writing. In addition, the performance of measurements requires highly specialized instruments and software. However, closely specialized measurements are accompanied by a toolkit and statistical procedures that are familiar with psychology and, more broadly, social sciences. That's why the research is being done by a team.

In a methodological plan, it applies triangulation, which aims at the convergence of the results of two lines of the study [8]. This approach is known in the psychological theory of the tests of the 1950s as the “multitrait-multimethod-matrix”. It allows the use of different methods, which may be from the same group. The example discussed above, concerns the triangulation of theories that explain the neural processes of writing time. The second type of triangulation used covers the methods used – those of psychology and those of neuroscience [4]. Advances in the development of both the social sciences and neuroscience create new opportunities to theorize practical phenomena such as the functioning of the human brain. One of these possibilities is the use of mixed-method design.

Mix-Method-Design as an Innovative Perspective for Research of Writing

At the modern stage, the mixed-method design represents a new understanding of the nature of science. It is not limited to quantity-quality dichotomy, but seeks a medium, pragmatically oriented way of solving complex problems [4]. Scientific knowledge becomes relatively independent of its creator and seeks to construct maximum objectivity. The results of these studies, according to Erzberger and Erzberger & Kelle, appear in terms as fully or partially identical; complementary; as distinct, and contradictory [4]. The supporters of mix-method-design define it as a pragmatic approach to solving scientific problems. In it, transforming scientific knowledge from quantitative to qualitative and vice versa is a sign of serious progress. A similar claim could be supported by an understanding of the code, both in anthropology and neuroscience. In anthropology, the coding category is important for the storage of data relevant to the researcher and therefore for the formulation of hypotheses and conclusions. It is therefore important to know what functions coding performs in field studies. Bernard [9] defined three types of coding:

- encryption device: summarizes information about a particular event;
- indexing device: identifies a specific variable;
- measurement device: shows the degree of manifestation of a property of a research object.

These three functions reduce the variation of the interpretation of the facts observed in the field or text studied. They simplify the systematization of information, and make it possible to identify the implication structures that are embodied in the ‘visible’ events.

In neuroscience, there are also found three various coding functions [10]. The authors define the following contexts for the use of coding:

- to reflect neural activity by statistically comparing the neurons and the features salient to the environment;
- to relate neural activity to observed behavior;
- to indicate various algorithms that would support processes that are of interest to neuroscientists.

The defined coding functions in neuroscience are specific to one

side because they represent a representation of a ‘hidden’ reality such as neural activity. From another, like anthropological codes, they are a prerequisite for understanding the activity of organisms, shortening the way to scientific description and explanation. According to the authors mentioned above, these three meanings of the category Code in neuroscience have their philosophical roots. They summarize this understanding in the following way: ‘Philosophers commonly understand representations to be entities that have semantic content (i.e. representation is about something), where different representations can represent the same thing in different ways’ [10]. The philosophical definition of code broadens its meaning and allows thinking about combining anthropological and neuroscientific thinking about it. A step forward in the creation of a single terminology explaining different human manifestations would be to study writing from an anthropological and neuroscientific point of view.

In my research experience, emotions occupy a special place. I was able to develop two diagnostic tools for self-evaluation of emotional sensitivity by 13-year-old students. Both instruments cover seven scales: activity, concentrated, tiredness, extroversion, introversion, fear, and self-confidence. The first instrument measures the current emotional sensitivity [11]; the second instrument measures the fluctuations of emotional sensitivity over time [12]. The scales are defined based on a questionnaire developed by Janke & Debus [13].

I also conducted a study with three scales developed by Pekrun, Goetz & Perry [14]: Enjoyment, Anxiety, and Boredom with a sample of 13-15-year-old students [15]. So it would be interesting for me to carry out a new study – namely, writing, with these tools in real conditions (in the classroom, at home, and in school), accompanied by the application of neuroscience methods. The attempt to create a new scientific language that combines the ideas of the two scientific strands would enrich the knowledge of writing as an overall social, cultural, and neurophysiological event. For such a study to be carried out, no doubt the mix-method design is the most appropriate.

Conclusion

The ideas presented so far about the relationship between the social body and the physiological body allow some assumptions to be made about future studies. Social and neurophysiological are reflected in the writing as a mirror. In this sense, they have an analog and symbolic character, which makes the category of the code a key category for understanding human activity in the writing process. Using a mix-method design is a new way to overcome the difficulties in studying complex phenomena such as writing. By overcoming the opposition to the quantitative and qualitative approach, it offers opportunities for its full study.

It would be interesting for science to track how writing facilitates the adaptation of the individual to the social environment and vice versa -- how the living organism reacts to this adaptation. The



monitoring of individual sociocultural and medical differences will have a positive impact on the practice of writing in educational institutions, understood in the broadest sense. The study of the body as a bearer of signs for the processes that define the individual profile of each person will reveal new horizons to science. The dynamics generated by the interaction of internal and external energy give a new meaning to the understanding of the human body as a 'tool' for carrying out various culturally significant activities, one of which is writing.

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