Originalni naučni rad
UDK 159.95:316.7 **http://doi.org/10.21301/ant2417**

Jelena Ćuković
Department of Ethnology and Anthropology
Faculty of Philosophy
jelena.cukovic@f.bg.ac.rs

CULTURAL ANTHROPOLOGY AND COGNITIVE SCIENCE: MAPPING THE ENVIRONMENT[1]

Abstract: Cognitive sciences have initiated the revolution in the interdisciplinarity of the research of the human mind, but cultural anthropology as one of the founding disciplines has gradually withdrawn from this group. The reasons for this are manifold, but the space emptied by anthropology has since then remained as such, or has been filled with predominantly psychological content or the content of cultural neuroscience. In recent years, developments in psychology, neuroscience and AI studies (shifts to constructivism) have led to a renewed call for anthropology to contribute its findings to an interdisciplinary understanding of the human mind and cognition through culture. This shift is evident in the field of environmental and space perception, which is pivotal for the understanding of the concept of reality. The aim of the paper is to present findings of the comparative analysis of classical anthropological theories and emerging theories in other cognitive disciplines regarding this topic, especially in neuroscience. The broader goal is to emphasize the importance of re-evaluating our categories of scientific disciplines and the separation of nature and culture as a distinguishing feature, and also to begin to fill the gap in the anthropological literature on this topic that has existed for almost a decade.

Keywords: cognitive sciences, constructivism, anthropology, culture, environment, reality

> "The outside universe we perceive doesn't exist as such. Through a series of electrical and chemical reactions, we generate a reality internally. We cre-

1 This research was financially supported by the Ministry of Science, Technological Development and Innovation of the Republic of Serbia as part of the financing program of scientific research at the University of Belgrade – Faculty of Philosophy (contract number 451-03-47/2023-01/ 200163).

> ate forests and oceans, warmth and cold. We read words, hear voices, and form interpretations. Then, in an instant, we produce a response. All of this in a world of our own creation."
> Rick Rubin, *The Creative Act: A Way of Being* (2023, 10)

Running a model of the world

The need for a paper like this became clear when I was creating the syllabus for my new course, Anthropology of Space and Place. The theme of the course revolves around people's perception of space, focusing on the cultural meaning and use of place. While I was summarizing the history of exploring and understanding the world around us in the course introduction, I had to include many philosophers, sociologists, and anthropologists, but also many physicists. I had to include all the explanations we humans have come up with to make sense of our surroundings, which we at times call space, outside world, environment or – reality.

For a long time it seemed that the natural sciences were concerned with things that existed objectively, factually, and with or without human perception, while the social sciences were concerned with their cultural meanings and subjective interpretations. But more and more you could see that individual "hard" scientists in mainstream global academia were theorizing about something that most anthropologists had been saying all along – all human perception is subjective perception. Starting with physicists who announce that there is no longer space which 'contains' the world, and there is no time 'in which' events occur (Rovelli 2016) and other scientists claiming that reality is not what is seems. At this point, I began incorporating work from neuroscience and psychology into my syllabus, realizing the importance of the cognitive approach to space and place.

Cognitive science can be broadly summarized as the scientific interdisciplinary study of the mind (Friedenberg & Silverman 2006, 2) and cognition. Its intellectual origins reside in the mid-1950s, when researchers in various fields began to develop theories of the mind based on complex representations and computational procedures, encompassing philosophy, psychology, artificial intelligence, neuroscience, linguistics, and anthropology (Friedenberg & Silverman 2006).

Now, it is safe to say that cognitive sciences have come to the conclusion that we humans do not perceive reality as it objectively is, but that we construct a model of it. Locked in a dark and silent box of a skull, (Feldman Barrett 2017) our brain receives signals that indicate changes in our environment and classifies them into different categories, guessing their meaning. The most elementary one is good or bad in terms of our survival, dangerous or safe, unpleasant or pleasant, and then branches out into incomprehensible complexity.

These realities at first seem unreachable and unobservable. Therefore, early research performed by cognitive scientists from all fields was criticized as nonscientific, with the argument that, since observation is the foundation of all science, there can be no science of thought or belief (Lanman 2008) Behaviorism, for example, suggests that disciplines like psychology should restrict themselves to examining the relation between observable stimuli and observable behavioral responses. It is similar with cultural anthropological research where, furthermore, we had to stick with what was perceived as cultural behavior (customs, rites, rituals) solely, as if it was totally independent from human cognition. The issue of consciousness and mental representations was in fact banished from respectable scientific discussion (Thagard 2023).

Meanwhile, the methodology of all of these disciplines has shown that there can be an adequate approach to the human mind. With various technological advances, such were psychology and neuroscientifically– conducted experiments, while anthropology offered ethnography, with observation with participation, or deep interviews as basically the science of outputs that focused on exploring the systems of concepts through their linguistic labels, and comparing them across languages in different cultural settings in order to discern their underlying principles of organization (Brown 2006, 96). Cultural anthropology developed its methodology with knowledge that one cannot get to culture directly, but only through the observation of communicative activity, with constructing (probably in imagination) a representation of culture of the people they study, since this is the only way to make sense of their activities (Brown 2006, 187).

Also, the constructivist point of view was first represented by sociology and anthropology[2], and the "hard" sciences of the cognitive group did not agree on this quality of objective reality. Therefore, in the following decades, anthropology took its own way on the path of researching the human mind and cognition, focusing mainly on human expression within constructed reality. Only recently, the other scientific community has voiced the idea that we as a species create the world around us as an interface for reality. The complete story of constructionism and constructivism is too large to be presented within this paper. I will use these as synonyms, even though they don't have the same meaning. I will also not differentiate between radical and social constructivism here, since it is my belief that the two should be considered in unison and not separately.[3]

2 The phrase "social construction" was officially introduced by Peter Berger and Thomas Luckmann's The Social Construction of Reality (1966), but the term was embraced and re-defined by numerous others in sociology and cultural anthropology.

3 Constructivism is a paradigm which is mostly concerned with learning, with the human way of accumulating knowledge. In social constructivism accent is given to a social interaction as a source of knowledge, while the radical approach mostly established by Jean Piaget, proposes that constructing knowledge is dependent on the individual's subjective interpretation of their active experience(Brau 2022)

When it comes to the structure of the paper, I will firstly focus on the two perspectives that are the most distinct in this interdisciplinary group of cognitive sciences – neuroscience and cultural anthropology, with a brief reflection on psychology, which falls somewhere in between. I will describe what the transition to constructivism looks like in these disciplines and combine perspectives in the last chapter, testing whether anthropology can regard this as an opportunity to find middle ground.

Since the question of weather or weather not cultural anthropology should rejoin cognitive science group needs more space to be answered, the discussion in the following pages serves as a basis mainly for the understanding of the topic of space and place, and the environment, not the one which likely exists outside of our bodies, but the one which our minds have modeled. For the purposes of the argument, I will use the term objective reality to refer to the putative world that exists without humans perceiving it, and the term environment as an interface or simulation that we as humans have created, so that we can maintain our existence and make sense of the signals we are experiencing. I think this analysis is very important for anyone interested in the specific and important topic of the relationship between humans and the environment.

Neuroscience and the construction of reality

Neuroscience has become a superstar of sciences in the past decade. Through its popular outputs, bestselling books, podcasts and YouTube channels, its insights have been spread among the laic public. The practical nature of experiments, research outcomes and the potential to formulate everyday tips for mental improvement (breathing techniques, the use of light and movement) and the so-called brain hacks, have made this scientific branch quite relevant and attractive to the modern human.

Neuroscience is the general study of the brain, and the nervous and endocrine systems. The attempt to explain cognitive processes in terms of underlying brain mechanisms is known as cognitive neuroscience (Friedenberg & Silverman 2006, 18).

Basically, a neuroscientist attempts to grasp how the sensory, cognitive and philosophical concepts we have developed about our minds throughout human history work — or perhaps do not work — at the cellular, electrical and computational level of our neurons (Whachspers, 2020).

Neuroscientists have shown that much of our behavior has its origins in certain brain parts. Robert Sapolsky, an eminent scientist and bestselling author, has popularized a theory that there is a biological explanation for every human behavior. He is a strong advocate for a non-existence of free will in terms of unprovoked, spontaneous human behavior – he states that our actions are always determent by multiple factors. One of them is our cultural background

and current social environment combined.[4]In that sense the structure of our brains is evenly determent by our experience.

A significant element of the discovery concerning brain parts employed for different capabilities is research conducted on people with damaged brains. Neuroscientists could map brain spots mostly responsible for different cognitive capabilities.

For example, Friedenberg and Silvermen (2006, 177–178) refer to the case of Oliver Sack's (neurologist) patient suffering from visual agnosia, which is considered to be the consequence of a general damage to the occipital lobes and nearby areas:

> "P.'s gaze is unusual, his eyes dart around as they take in Sacks's face, fixating on one feature and then another. P. is unable to recognize a rose and describes it as "a convoluted red form with a linear green attachment." During one interview with Sacks, P. took hold of his wife's head as he apparently tried to lift it and put it on his own head. Sacks writes: "He had ...mistaken his wife for a hat!""

It appears that the brain is a strictly structured organ, that organizes our thoughts, capabilities, behavior etc., and that we can map these in its specific parts. This made neuroscientists believe that the human body, epitomized in the brain, represents a hardwired basis for a software like culture. For a long time, neuroscientists believed that the brain's structure and function were essentially fixed throughout adulthood, and mostly genetically determined during childhood.

However, with the discovery of the phenomenon called neuroplasticity, it became evident that culture has a role in brain wiring – that its physical features can be changed through individual practices and social interaction. There is clear evidence that sustained experiences may affect both the structure and function of the brain. Therefore, it is entirely plausible to suggest that prolonged engagement with a specific array of cultural encounters and habitual actions could influence both the structure and functioning of the brain (Park and Huang 2010).

Neuroplasticity refers to the brain's capacity to undergo alterations and adjustments in response to various experiences. It is an umbrella term referring to the brain's ability to change, re-organize, or grow neural networks. This process can include functional changes caused by brain damage, or structural changes, which are the result of learning (Cherry 2022).

Our minds actively assimilate the patterns present in our cultural surroundings. These mental representations subsequently affect our interactions with, and the molding of our environments. Culture plays a significant role in the

4 I made this quite simplistic synthesis of Sapolsky's theories according to his books *Biology and Human Behavior: The Neurological Origins of Individuality*(2005) and *Behave: The Biology of Humans at Our Best and Worst* (2017).

wiring and activating of the brain, yet the brain remains adaptable. Similar to how shifting tides can alter imprints in the sand, evolving experiences can re-shape brain activity over time. Thus, the brain can be likened to a "cultural sponge," absorbing the norms of our physical and social landscapes (Ambady 2011).

Collective and cultural neuroscience is a rapidly growing field of research. A notable and consistent discovery from early studies indicates that when individuals engage in conversation or collectively share an experience, their brain waves synchronize. Neurons in their corresponding locations in different brains fire at the same time, creating matching patterns. Auditory and visual areas respond to shape, sound and movement in similar ways, whereas the same brain areas seem to behave similarly during more challenging tasks, such as making meaning out of something that was either seen or heard (Denworth 2023).

When *exploring* the connection between human brain and spatial orientation, neuroscientists have identified hippocampus as specifically important for allocentric spatial memory, meaning that the hippocampus is essential for the remembrance of object locations (Shrager et al. 2007).

Also as reported in Nature Neuroscience in 2022, the study reveals that neurons within the hippocampus, crucial for spatial navigation, memory, and planning, encode space according to a non-linear hyperbolic geometry — a three-dimensional structure that expands outward exponentially, akin to the interior of an expanding hourglass. Furthermore, the research indicates that the spatial representation within the hippocampus expands in size as individuals spend more time at a particular location. This expansion follows a logarithmic pattern that aligns with the maximum potential increase in the information processing capacity of the brain.[5] Simply put, it shows us that the more we interact with a specific place, the more detailed the cognitive map will be, and the place will be perceived as larger.

Given the complexity of research components, several neuroscientists have condensed their studies on human perception into easily understandable popular expressions, using analogies to illustrate the quality of our reality. A good example is Anil Seth, whose educational background spans physics, psychology, and artificial intelligence. Seth posits that reality is a controlled hallucination of our consciousness. In his book *Being You: A New Science of Consciousness*, he argues that our experiences of the world do not grant us direct, unimpeded access to external reality. According to the neuroscience theory, the brain consistently generates predictions about our environment, and in that way maintains the interface that we wake up to everyday, thinking it is objectively there.

Another interesting shift coming from Anil Seth, valuable for understanding the perception of space around us is that instead of perception depending largely on signals coming into the brain from the outside world, it depend

5 This is an interpretation of the research conducted by Zhang et al. (2023) from *Neuroscience* journal, the link can be found in the list of sources at the end of the paper.

as much, if not more on perceptual predictions, following in the opposite direction. We don't just passively perceive the world we actively generate. The world, as we experience it comes as much, if not more from the inside out as from the outside in. The main proof for this statement Seth and his team see in software constructed to have overly strong perceptual predictions, which is consistent with hallucination people might report in altered states of mind.[6]

Psychological stance as a bridge between individual brain and society

Lisa Feldman Barrett, a neuroscientist and psychologist, is among the best known authors to link up constructivism of reality within the science of the brain. In her book *How emotions are being made*, she states that the discovery of *simulation* in the late 1990s ushered in a new era in psychology and neuroscience. Research conducted so far has shown that what we see, hear, touch, taste, and smell are largely simulations of the world, not reactions to it. Furthermore, we can speculate that simulation is a common mechanism not only for the perception of, but also for the understanding of language, feeling empathy, remembering, imagining, dreaming, and many other psychological phenomena. Our common sense, especially in Western cultures, as Barrett states, might declare that thinking, perceiving, and dreaming (or hallucinating) are different mental events, yet one general process describes them all. Simulation is, Lisa concludes, the default mode for all mental activity (Feldman Barrett 2017, 40)

Simulation, or the model of the world that the brain is running, is constructed by various signals, and organized by pre-conceived concepts and categories. Barrett also changes the order of perception:

> „Your concepts are a primary tool for your brain to guess the meaning of incoming sensory inputs. For example, concepts give meaning to changes in sound pressure so you hear them as words or music instead of random noise. In every moment, your brain uses past experience, organized as concepts, to guide your actions and give your sensations meaning." (Feldman Barrett 2017, 41)

As Feldman Barrett explains further – sound, therefore, is not an event that is *detected* in the world. It is an experience *constructed* when the world interacts with a body that detects changes in air pressure, and a brain that can make those changes meaningful. Without a perceiver there is no sound, only

6 More on this topic can be found in Anil Seth's book *Being You: A New Science of Consciousness* (2021), and the details of software with overly strong perceptual predictions are available on his Ted Talk video. The link can be found in the list of sources at the end of the paper

physical reality. Sound is therefore part of what was considered to be a different kind of reality that we humans construct – social reality, which is known to exist only for those who are equipped to perceive it.

Cognitive psychologists seem to introduce culture in this neuroscience/psychological theory – culture inevitably provides *some kinds* of concepts for making sense of sensory input. So, the meaning of the same sensory input is culturally relative, since the environment is wiring the brain, which is not a definitive process – it is always context-dependent.

The researchers in the filed found that living in a culture that produced patterned pottery enhanced the ability of their people to talk about shapes, and that in cultures which placed particular value on their special musical heritage, people were able to communicate more efficiently when it comes to describing sounds. In short, there is no single universal hierarchy of senses or a dichotomy between higher and lower senses: influenced by culture, every language has its own sensory story to tell.[7]

Another important issue, that has been raised, is the interdependence of individuals when it comes to making sense of the world, following the closing idea in previous chapter that we are not passive recipients of the phenomena of the world – we actively shape them. Barret Feldman views humans as social animals that influence each other's perception of reality. But the psychological notion of the self can help us to not fall into problematic determinism, whether by biology or by culture, because although we are synchronized, we also have individual particularities in this reality.

The setting, place and space are very important for psychological research. But psychology still makes a distinction between primarily physical and social surrounding. However, there is a discipline whose (mostly comparative) research shows that this distinction is not useful for understanding the connection between humans and the environment, and that many physical features of the world around us are also social, and this is just one of the contributions cultural anthropology has made thus far.

Cognitive anthropology as an absent partner

> "[culture is] whatever it is one has to know or believe in order to operate in a manner acceptable to its members, and do so in any role that they accept for any one of themselves" (Goodenough, 1957, 167)
> "It is one thing to suggest that anthropology and cognitive science had a good first date; it is quite

7 The study referred in this article: Not Biology, Culture Shapes How We Talk About Senses. https://www.mpi.nl/news/not-biology-culture-shapes-how-we-talk-about-senses

> another to determine why the relationship did not progress further" (Bender et al 2010)
> "As far as cultural anthropology is concerned, cognitive mechanisms are on the side of "nature." " (Bloch 2012)

Cultural anthropologists were among the first scholars to relativize the existence of a singular truth and reality. Anthropological fieldwork has forced researchers to engage with different contexts and worldviews and adapt to sometimes radical differences. The modern anthropologist is not concerned with verifying and conjuring up the actions, values and beliefs of his interlocutors, but with trying to understand why people think and act the way they do. As we can conclude from the previous chapters, researchers in other cognitive sciences have now found themselves to be in the same position. So, what advice can anthropology offer from its rich experience?

If we maintain the stance that cultural anthropology and cognitive science do not have the same interests, we must regard natural and cultural processes as completely separate. This means that we see the brain and body as natural, shaped by genetic information, and the mind as culturally constructed by social information, mainly through language, belief systems, conventions, and moral codes. But as evidence accumulates that the full extent of genetic predisposition is conditioned by environmental and culturally-determined conditions, and some cultural elements are in return shaped around genetic predisposition, we must again pose the question whether this division is perhaps meaningless? Within our old categories and traditional scientific division, this line seems reasonable, but as things are actually more complex than this, we may conclude that it is futile.

As mentioned, cultural anthropology of the late 20th century is marked by a decisive rejection of the incorporation of natural science's knowledge and methodology in its research and theories. 'Positivism,' which was general trait of natural sciences, was a movement that cultural anthropology could do without (Roscoe 1995, 492). The methodology that was forced upon this discipline as only scientific regarded humans as objects too rigid to understand complex creations that we ourselves represent.

On the other hand, anthropologists know that cultural meanings are not chaotic or random, but rather that they form complex patterns. Much of anthropology has been dedicated to working out the principles of organization of the systems of meaning. At first glance, this seems like a project that would captivate cognitive science (Bender et al. 2010).

Positioned at the crossroads of cultural anthropology and cognitive science, cognitive anthropology primarily aims to elucidate the mental representations and processes that comprise cultural content (Wassman & Bender 2015). In 1991(183 –198), Mourice Bloch famously noted that cultural anthropology is a "rather shadowy partner" to other cognitive sciences, same

as cognitive anthropology is to the rest of the disciplines. Although cognitive anthropology strives for objectivity, its questions, theories, and methods had little in common with other scientific subfields of anthropology. In addition, many anthropologists would fail to recognize this as their business at all (Bloch 1991).[8]

Meanwhile, scholars have come to understand that cognition cannot be fully understood or explained without reference to a specific body (embodiment) or to a specific cultural environment (situatedness) (Wassmann & Bender 2015, 16).

Cognitive anthropology placed in the wider context of cognitive sciences is usually employed to expand the examination of human thinking in order to consider how thought works in different cultural settings. Cultural anthropologists primarily rely on ethnography as their main method, which entails residing within and actively engaging with members of a culture to the extent that their social and cognitive systems become discernible (Thagard 2023). The most famous examples are ethnobiology, studying people's relationships with plants and animals in the sense of principles for perceiving, classifying, and naming biological kinds, and the cross-cultural research of colors (Bender et al. 2010) and their classifications and meanings.

Before the emergence of cognitive anthropology, there were pioneering figures who laid the groundwork by developing anthropological perspectives on language and cognition, often examining them in a comparative manner. Notable among these are American anthropological linguists such as Boas, Sapir and Whorf, as well as French structuralists like Hertz, Mauss, Levi– Bruhl, and Levi-Strauss. However, cognitive anthropology today represents a loose coalition of researchers in several distinct sub disciplines, where developments are converging on a renewed interest in cognition in its cultural setting (Brown 2006, 96).

Originally termed as "the new ethnography," "ethnographic semantics," or "ethnoscience," cognitive anthropology advocated for a shift within anthropology away from conceptualizing "culture" solely in terms of observable behavior or material artifacts towards understanding "culture" in broader cognitive terms (Brown 2006, 98).

In the work of Claudia Strauss and Naomi Quinn, whose ideas were developed for a couple of decades, some useful terms have been found. They studied metaphors as a linguistic form that can only be used in the context of similarly-structured minds, which were structured by culture. The terms schema, conceptual schemata, folk model, or ideational system (Strauss &

8 Cognitive anthropology within the context of academic community in the Republic of Serbia is not a well-known or accepted sub discipline. Bojan Žikić is one of the prominent authors who introduced us to the basics of cognitive anthropology, and some of its interesting tools that could be traced in structuralist/semantics sporadic analysis. I tried to incorporate some of the analytical tools in my research of intangible cultural heritage (the concept of dissonance) and environmental issues (natural categories, and spatial schemata). All of the mentioned articles are listed at the end of the paper.

Quinn 1997, 4) represent abstract concepts that act as intermediaries between stimuli perceived by the sense organs and the behavioral responses they elicit. These concepts form the foundation for all human information processing (Casson 1983). The most important models for representing knowledge in cognitive anthropology are taxonomy, paradigm, prototype script, schema, cultural model, mental images (Wassmann & Bender, 2015, 18–19)

The demands of cognitive sciences did not meet the mission of anthropology, not even with the emergence of the cognitive sub-discipline and certainly not in terms of methodology. The exploration of cognitive cultural models within cultural anthropology had to be done through in-depth interviews, living with the community and participating in their daily lives. The rest of the cognitive disciplines wanted experiments with controlled conditions, possibility with intervention and change of variables – which cultural anthropologists do not consider to be an appropriate way of understanding culture.

Anthropologists in cognitive sciences have always felt that they weren't properly recognized, with their research evidence often perceived as anecdotal because of the qualitative approach. Furthermore, the positivist tendencies that still characterized natural sciences did not fit into the realm of social sciences and humanities, which was taken over by postmodernism. The approaches were, and still are very different. It seems that in the absence of anthropological and ethnological research, cross-cultural and comparative analysis is still part of the cognitive sciences' concern, but it is mainly a matter of generalizations and essentialisations, and when we encounter them, it appears that our discipline's decision to have nothing to do with them was indeed the right one.

But what will happen if "hard" sciences change the approach, will in that case cultural anthropology be willing to reconsider interdisciplinarity outside of the positivistic tendencies of the science of natural phenomena?

Cognitive sciences reunited: the construction of space and place

As it was mentioned, in the past couple of decades, several leading authors have oriented themselves towards neuroscience, biology and psychology, and have shifted the focus of their research, with what can be seen as an invitation for interdisciplinarity, giving the cultural context an important role in understanding what was perceived as distinctly biological processes. One of them, Lisa Feldman Barrett, who was mentioned in previous chapters, has based her work on the idea of reality as a simulation constructed through the categorization of experience. This is connected with the hypothesis of the abovementioned Anil Seth describing reality as being a controlled hallucination, and that of Donald Hoffman, who argues that the human species have evolved not to see the world as it is, but as it is useful to be seen. With the

steady development of AI[9], it has become evident that sounds, colors, shapes, and textures that people perceive are limited and not likely to be representative of the world around us.

> "...we create an apple when we look, and destroy it when we look away. Something exists when we don't look, but it isn't an apple and is probably nothing like an apple. The human perception of an apple is a data structure that indicates something edible (a fitness pay-off[10]) and how to eat it. We create these data structures with a glance and erase them with a blink. Physical objects, and indeed the space and time they exist in, are evolution's way of presenting fitness pay-offs in a compact and usable form."

The „convoluted red form with a linear green attachment", which most of us perceive as a rose, same as an apple, is one level of modeling a construct around perceived signals of this element of the outside world . We evidently have to be equipped not solely with cultural knowledge, but also with a capable organ to translate that signal into the knowledge of the existence of a rose.

Thus, in order to understand how this separation of objective reality came to be the trait of our species, and why we've evolved to run on simulation of the world, once again different approaches have to be united.

Although anthropology and neuroscience are usually seen as completely separate disciplines, in different scientific branches, they can be linked in many ways. The most important being that of categories. In particular, cognitive anthropology studies the relationship between human society and human thought (D'Andrade 1995, 1), and cognitive neuroscience has succeeded in uncovering a variety of relationships between cognitive systems and the specific structures of the human brain (Pulvermüller et al. 2014, 1).

With an interdisciplinary view, we could understand the connection between the social input in the perception of reality, and the effects on the brain responsible for executing a model of reality created by this input. If the brain is organized by experience, and experience is organized by culture, should we then not expect that culture is a formative force in cognitive processes? (Bender et al. 2010, 374–385) There is a general consensus regarding the importance of

9 As with images and other forms of representation, at various times and places human cultures have expressed doubts about the validity of sense data as a means of obtaining knowledge about the world (Goody 2002). In the history of Western science, several big counter-intuitive and counter– common– sense perceptions were proven wrong, for example flat earth and the geocentric system of universe.

Galileo Galilei is apparently famous for the quote "I think that tastes, odors, colors, and so on... reside in consciousness. Hence if the living creature were removed, all these qualities would be wiped away and annihilated.", and he was also famous for being punished for challenging the Christian paradigm on reality.

10 Within the vocabulary of the theory of evolution, mixed with game theory rhetoric, fitness pay-off is something that will contribute to survival and the ability to reproduce. This perception will differ – from species to species, from person to person, and even from time to time – as needs and niches differ. Reproductive success depends on collecting fitness points (Hoffman 2019, 33).

bringing culture into the equation, but only anthropologists and ethnologists possess this complex notion of culture, that will not allow the mentioned statement to be understood as deterministic and essentialist, or to become a reason for hierarchization, discrimination and racism.

In the quote positioned before cultural anthropology, the chapter culture is placed in the head rather than in the outside world, which is what Feldman Barrett's and Seth's big theoretical shifts are about. Categories formed by cultural values perceive the world in a specific way, and even though these are shared, they are not uniform. One human brain in a human body, raised and wired in a specific culture, will produce a specific kind of mind. A mind is something that emerges from a transaction between brain and body while they are surrounded by other brains-in-bodies that are immersed in a physical world while constructing a social world (Feldman Barrett 2021).

Let us consider the construction of environment with everything we know so far.

"Hard" science is telling us that between birth and early adulthood, the brain requires sensory stimulation to develop physically. The type of stimulation individuals receive influences the formation of neuronal connections, which in turn construct neural networks crucial for cognition and behavior. As individuals reach early adulthood, the brain's neuroplasticity significantly diminishes, causing a pivotal change in how they interact with their environment. In the initial stages of life, the brain and mind adapt to prevailing environmental factors, whereas in early adulthood, individuals seek to align their surroundings with the established internal structures of their brain and mind.

But this does not mean that adult brains are not capable of adaptation, which is shown through professional experience. Structural MRIs of the brains of humans with extensive navigation experience, such as licensed London taxi drivers, were analyzed and compared to those of control subjects who did not drive taxis. [11]

It is noted that both efficient navigation and episodic memory require the detection of crucial junctions separating individual segments of space or experience. In both the spatial and episodic domains, boundaries segregate elements of experience and serve as cues to bind information into cohesive units. The segmentation of experiences in spatial and non-spatial domains may

11 "The posterior hippocampi of taxi drivers were significantly larger relative to those of control subjects. A more anterior hippocampal region was larger in control subjects than in taxi drivers. Hippocampal volume correlated with the amount of time spent as a taxi driver (positively in the posterior and negatively in the anterior hippocampus). These data are in accordance with the idea that the posterior hippocampus stores a spatial representation of the environment and can expand regionally to accommodate elaboration of this representation in people with a high dependence on navigational skills. It seems that there is a capacity for local plastic change in the structure of the healthy adult human brain in response to environmental demands"(Maguire et al. 2000)

share neural underpinnings, manifesting in similar behavioral phenomena and cognitive biases (Brunec et al. 2018)

Knowledge about the environment is gained through direct interaction or exposure to various settings. This interaction can be direct, such as living in or traveling through a specific environment. Alternatively, it can occur indirectly through accessing diverse information sources like photos, videos, paintings, or tactile maps or other people's description. When needed, this information is processed to understand aspects like location, distribution, patterns, connectivity, and configuration, aiding in travel planning and movement. Given the diversity of environments, it's impractical to refer to a singular "environment" (Golledge 2020). [12]

This is to a great extent in accordance with Bourdieu's concept of habitus, and its ideas of learning culture while using communal space, especially in childhood. Habitus is the learned set of preferences or dispositions by which a person orients to the social world. It is a system of durable, transposable, cognitive schemata or structures of perception, conception and action (Bourdieu, 2002, 27). Habitus emerges from a collective social process rather than from individual actions, resulting in enduring patterns that are transferable across different contexts, but which also evolve in response to specific situations and temporal changes. It is not rigid or permanent; rather, it can adapt and transform unexpectedly or gradually over extended historical periods (Navarro 2006, 16). He also views habitus as a position in social space, which is a concept that expresses the articulations between physical space and sociality (Reed-Danahey 2020).

The habitus finds its roots in an innovative fusion of ideas stemming from the proto-structural anthropology of Durkheim and Mauss, the post-Saussurean structural anthropology of Levi-Strauss, and the psychological genetic structuralism of Jean Piaget (Lizardo 2009). When one thinks about Feldman Barrett's description of the model of the world that the brain is constructing, one has to be reminded of Bourdieu's definition of habitus:

> A system of lasting, transposable dispositions which, integrating past experiences, functions at every moment as a matrix of perceptions, appreciations, and actions and makes possible the achievement of infinitely diversified tasks, thanks to analogical transfers of schemes permitting the solution of similarly shaped problems (Bourdieu 1968, 3)

The habitus also includes cognitive schemas, which Bourdieu conceives as being independent from, if at times directed by, the body. Research from cognitive neuroscience and psychology shows that while Bourdieu was correct to argue that changes in bodily states can activate cognitive schemas, he was mistaken to treat the cognitive and somatic components of the habitus as being strictly separable from each other (Ignatow 2008).

12 Anthropologists would add that knowledge about heaven, hell, purgatory, utopia, Atlantis, Walhalla, Neverland or so called fictional spaces also needs attention within research.

Let us imagine that a person is entering a new space, or rather a place. His or her behavior will be the consequence of its cognitive processes. According to past experiences and categories that already exist in the mind, a person will start to organize sensory information and adapt his or her model of the world. The spatial categories, positions and relations are filled with cultural meanings. Things that are in front or above are dominantly perceived as hierarchically more important, things in the shade rather than in light are shameful, bad, mysterious, and secretive. Left and right are positions loaded with ideological and political content. We begin to use the place or area after we make some kind of a cognitive map, and use this for our automatic or strategic behavior.

This is why "hard" sciences could benefit from the reflexive nature of anthropological methodology. It is important to note that the researcher's mind is also a mind, and that the research always depends largely, for better or for worse, on the habitus more or less corrected and controlled by the person conducting it (Reed Donahey 2020).

Let us discuss once more the „convoluted red form with a linear green attachment" that mister P. failed to recognize as a rose. Once that brains that are capable of predicting the existence of a rose (unlike mister P.'s) construct it from matching signals, what follows is a further categorization (even more abstract), which is important for the reproduction of response or the initialization of behavior. Should one pick it up and give it to someone, nurture it the way it is, or remove it and throw it away – it is context-sensitive. As a neuroscientist / psychologist Lisa Barrett Feldman puts it: "a rose is usually considered a flower, but it becomes a weed if you discover it in a field of vegetables "(151–152).This insight aligns with Mary Douglas's anthropological theory elaborated in the book *Purity and danger*. It is the context, or a position of the same entity that will change the way we perceive it – do we expect it to be there, did our brain predict this possibility? If not, it will pose a threat. Douglas makes an important remark, that culture is creating order from chaos, with its categories.

Creating order, and making sense of the environment, looks like a recognition, but it is actually an invention! This is what anthropologists have been saying about cultural knowledge for some time now, this is what race, gender, and sexuality studies are all about, but it's now being applied on every type of category and knowledge.

Neuroscientists explain that other than moving our bodies, learning something new is the most expansive process in the metabolic sense, because it demands the change in perception of the world and of the self (Padamsey and Rochefort 2023). Learning in constructivist paradigm means adapting the simulation of the world to signals that brain did not predict. New signals are changing and updating our interface.

Finally, the most important point of the theoretical overlap between classical anthropology and new insights in other sciences (mainly neuroscience), resides in the studies of material culture, specifically within the concept of an artifact.

The novel studies of material culture, led by anthropologist such as Daniel Miller (1994) have reformed the definition of artifact from being strictly a tool made by man, to that of an abstract form created as a concept.

In this sense, the distinction between artificial, cultural, man-made as opposed to natural, non-intervened in, is of no use in either discipline. We have created reality, it is artificial, but at the same time this ability is in our nature. If there is one important insight this paper makes, it is that the understanding of signals of objective reality, according to which the brain creates a simulation of the external world, cannot be separated from culture. No (understanding of) sound, color, shape, texture, smell can be separated from what we define as cultural meaning. For this reason, anthropology as a cultural science must once again engage in conversation with other disciplines, with which it once formed the cognitive science.

Concluding remarks

The main shift analyzed in this article is in fact the one that could be observed in the order of perception – from inside to outside. It seems that the idea that these internal predictions and categories that generate the external world are cultural contents and are determined by culture is now generally accepted. If this is the case, which is shown in this paper, it is the duty of anthropology to consider how important it is to contribute with its understanding of culture. It is important to consider cultures not as insular and essentialized entities, but as networks of meanings which are something that the other cognitive sciences struggle with.

While making the case, I have referred to some of the most problematic and extensive aspects of the understanding of humans. During this analysis, a number of authors who have dedicated their professional lives to gaining insights into the relations between human cognition and objective reality were not included, but a selection had to be made. In the interest of a comprehensive argument, I have approached this topic using the concrete example of spatial cognition and, as an anthropologist I have focused on the points where our professional perspective can be useful.

It is paradoxical that anthropology is abandoning and being deserted by other cognitive sciences at the very time when the role of culture is becoming increasingly recognized as being highly relevant to the science of human cognition (Beller et al 2011, 2). The main point of interference lies in the notion that the environment is shaped by culture and vice versa, and that both are capable of altering the human brain, which generates reality.

Anthropology can make a contribution by conducting a research of cultural content, with comparative overview, but also by providing a reflexive perspective on scientists and their cognitive schemas, biases that either help or

stand in the way of understanding those processes. It can help with developed ethics, which is the result of centuries-long work with people. In popular content there is no mention of anthropological contribution to theories about human perception of environment and reality, which is an issue that should be more strongly addressed.

Literature:

Beller, Sieghard, Andrea Bender and Douglas Medin. 2012. "Should Anthropology Be Part of Cognitive Science?" *Topics in Cognitive Science* 4: 342–353. https://doi.org/10.1111/j.1756–8765.2012.01196.x.

Bender, Andrea, Edwin Hutchins, and Douglas Medin. 2010. "Anthropology in Cognitive Science." *Topics in Cognitive Science* 2: 374–385. https://doi.org/10.1111/j.1756–8765.2010.01082.x.

Bloch, Maurice. 1991. "Language, Anthropology and Cognitive Science." *Man* (n.s.) 26: 183–198.

Bloch, Maurice. 2012. *Anthropology and the Cognitive Challenge*. Cambridge: Cambridge University Press.

Bourdieu, Pierre. 1968. "Structuralism and Theory of Sociological Knowledge." *Social Research* 35 (Winter): 681–706.

Bourdieu, Pierre. 2002. "Habitus." In *Habitus: A Sense of Place*, edited by Jean Hillier and Emma Rooksby, 27–34. Burlington, VT: Ashgate.

Brau, Barry. 2022. "Constructivism." In *Education Research*, edited by Royce Kimmons. BYU Open Learning Network. https://open.byu.edu/education_research/constructivismy.

Brown, Penelope. 2006. "Cognitive Anthropology." In *Studies in the Social and Cultural Foundations of Language 23: Language, Culture, and Society*, edited by Claire Jourdan and Kevin Tuite, 96–114. Cambridge: Cambridge University Press.

Brunec, Iva K., Morris Moscovitch, and Meghan D. Barense. 2018. "Boundaries Shape Cognitive Representations of Spaces and Events." *Trends in Cognitive Sciences* 22 (7): 637–650. https://doi.org/10.1016/j.tics.2018.03.013.

Casson, Ronald W. 1983. "Schemata in Cognitive Anthropology." *Annual Review of Anthropology* 12: 429–462.

Ćuković, Jelena. 2019. *Nematerijalno kulturno nasleđe iz antropološke perspektive: reprezentativnost, selektivnost i instrumentalizacija*. Beograd: Filozofski fakultet u Beogradu, Odeljenje za etnologiju i antropologiju i Dosije studio.

Ćuković, Jelena. 2023. "Životna Sredina u Eko-Aktivističkim Narativima." In *Horizonti Budućnosti: Antropološki i Drugi Naučni Pristupi*, edited by Bojana Bogdanović and Kristina Obšust, 203–223. Novi Sad, Beograd: Arhiv Vojvodine, Etnografski institut SANU.

D'Andrade, Roy G. 1995. *The Development of Cognitive Anthropology*. Cambridge: Cambridge University Press.

Friedenberg, Jay, and Gordon Silverman. 2006. *Cognitive Science: An Introduction to the Study of the Mind*. Sage Publications.

Golledge, Reginald G. 1992. "Cognition of Physical and Built Environments." In *Environment, Cognition, and Action: An Integrated Approach*, edited by Tommy

Gärling and Gary W. Evans. Oxford: Oxford Academic. https://doi.org/10.1093/oso/9780195062205.003.0007.

Goodenough, Ward H. 1957. "Cultural Anthropology and Linguistics." In *Report of the Seventh Annual Round Table on Linguistics and Language Study*, edited by Paul Garvin. Georgetown University Monograph Series on Language and Linguistics 9. Washington, DC: Georgetown University.

Goody, Jack. 2002. "The Anthropology of the Senses and Sensations." *La Ricerca Folklorica* 45: 17–28. https://doi.org/10.2307/1480153.

Guindi, Fadwa El, and Dwight W. Read. 2014. "Can There Be Cognitive Science Without Anthropology?" *Topics in Cognitive Science* 6 (1): 144–145. https://doi.org/10.1111/tops.12051.

Ignatow, Gabriel. 2009. "Culture and Embodied Cognition: Moral Discourses in Internet Support Groups for Overeaters." *Social Forces* 88 (2): 643–669.

Lanman, Jonathan. 2008. "U odbranu 'verovanja': kognitivni odgovor bihejviorizmu, eliminacionizmu, i socijalnom konstruktivizmu." *Etnoantropološki problemi* 3 (3): 49–62. Beograd: Odeljenje za etnologiju i antropologiju.

Lizardo, Omar. 2004. "The Cognitive Origins of Bourdieu's Habitus." *Journal for the Theory of Social Behaviour* 34: 375–401. https://doi.org/10.1111/j.1468–5914.2004.00255.x.

Maguire, Eleanor, David Gadian, Ingrid Johnsrude, Catherine Good, John Ashburner, Richard Frackowiak, and Christopher Frith. 2000. "Navigation-Related Structural Change in the Hippocampi of Cab Drivers." *Proceedings of the National Academy of Sciences of the United States of America* 97: 4398–4403. https://doi.org/10.1073/pnas.070039597.

Miller, Daniel. 1994. "Artefacts and the Meaning of Things." In *Companion Encyclopedia of Anthropology*, edited by Tim Ingold, 396–419. London: Routledge.

Navarro, Zander. 2006. "In Search of Cultural Interpretation of Power." *IDS Bulletin* 37 (6): 11–22.

Padamsey, Zahid, and Nathalie Rochefort. 2023. "Paying the Brain's Energy Bill." *Current Opinion in Neurobiology*. https://doi.org/10.1016/j.conb.2022.102668.

Padamsey, Zahid, and Nathalie Rochefort. 2023. "Paying the Brain's Energy Bill." *Current Opinion in Neurobiology*. https://doi.org/10.1016/j.conb.2022.102668.

Park, Denise C., and Chih-Mao Huang. 2010. "Culture Wires the Brain: A Cognitive Neuroscience Perspective." *Perspectives on Psychological Science* 5 (4): 391–400. https://doi.org/10.1177/1745691610374591.

Pulvermüller, Friedemann, Max Garagnani, and Thomas Wennekers. 2014. "Thinking in Circuits: Toward Neurobiological Explanation in Cognitive Neuroscience." *Biological Cybernetics* 108 (5): 573–593. https://doi.org/10.1007/s00422–014–0603–9.

Reed-Danahay, Deborah. 2020. *Bourdieu and Social Space: Mobilities, Trajectories, Emplacements*. Berghahn Books. https://doi.org/10.2307/j.ctv1dwq1m3.

Roscoe, Paul. 1995. "The Perils of 'Positivism' in Cultural Anthropology." *American Anthropologist* 97 (3): 492–504.

Rovelli, Carlo. 2016. *Reality Is Not What It Seems: The Journey to Quantum Gravity*. Penguin Books.

Shrager, Yael, Peter J. Bayley, Bruno Bontempi, Ralph O. Hopkins, and Larry R. Squire. 2007. "Spatial Memory and the Human Hippocampus." *Proceedings of the National*

Academy of Sciences of the United States of America 104 (8): 2961–2966. https://doi.org/10.1073/pnas.0611233104.

Stocker, Kurt. 2014. "The Theory of Cognitive Spacetime." *Metaphor and Symbol* 29: 71–93. https://doi.org/10.1080/10926488.2014.889991.

Strauss, Claudia, and Naomi Quinn. 1997. *A Cognitive Theory of Cultural Meaning*. Cambridge: Cambridge University Press.

Thagard, Paul. 2023. "Cognitive Science." In *The Stanford Encyclopedia of Philosophy (Winter 2023 Edition)*, edited by Edward N. Zalta and Uri Nodelman. https://plato.stanford.edu/archives/win2023/entries/cognitive-science/.

Wassmann, Jürg, and Andrea Bender. 2015. "Cognitive Anthropology." *International Encyclopedia of the Social & Behavioral Sciences*, 16–22. https://doi.org/10.1016/B978–0–08–097086–8.12035–5.

Wexler, Bruce E. 1996. *Brain and Culture: Neurobiology, Ideology, and Social Change*. MIT Press.

Zhang, He, Peter D. Rich, Annabelle K. Lee, et al. 2023. "Hippocampal Spatial Representations Exhibit a Hyperbolic Geometry That Expands with Experience." *Nature Neuroscience* 26: 131–139.

Žikić, Bojan. 2007. "Kognitivne 'Priče za Dečake': Urbani Folklor i Urbana Topografija." *Etnoantropološki problemi* 2 (1): 73–108. Beograd: Odeljenje za etnologiju i antropologiju.

Žikić, Bojan. 2008. "Kako Složiti Babe, Žabe i Električne Gitare: Uvod u Kognitivnu Antropologiju." *Antropologija* 6 (6): 117–139. Beograd: Institut za etnologiju i antropologiju.

Sources:

Ambady, Nalini. 2011. "The Mind in the World: Culture and the Brain." *Psychological Science Observer*. https://www.psychologicalscience.org/observer/the-mind-in-the-world-culture-and-the-brain.

Cherry, Kendra. 2022. "What Is Brain Plasticity?" *Verywell Mind*. https://www.verywellmind.com/what-is-brain-plasticity-2794886.

Denworth, Lydia. 2023. "Brain Waves Synchronize When People Interact." *Scientific American* 329 (1): 50. https://www.scientificamerican.com/article/brain-waves-synchronize-when-people-interact/.

Feldman Barrett, Lisa. 2017. *How Emotions Are Made: The Secret Life of the Brain*. Houghton Mifflin Harcourt.

Hoffman, Donald D. 2019. *The Case Against Reality: Why Evolution Hid the Truth from Our Eyes*. W. W. Norton & Company.

Rubin, Rick. 2022. *The Creative Act: A Way of Being*. Canongate Books.

Sapolsky, Robert M. 2005. *Biology and Human Behavior: The Neurological Origins of Individuality*. The Teaching Company.

Sapolsky, Robert M. 2017. *Behave: The Biology of Humans at Our Best and Worst*. New York: Penguin Press.

Seth, Anil. 2021. *Being You: A New Science of Consciousness*. Faber & Faber.

Anonim. 2023. "Spatial Perception Growth." *Neuroscience News*. Retrieved from https://neurosciencenews.com/spatial-perception.

Wachspress, Erica. 2020. "How to Think About Thinking." *Neuroscience at The University of Chicago*. https://neuroscience.uchicago.edu/.

Јелена Ћуковић

Културна антропологија и когнитивне науке: Мапирање околине

Апстракт: Когнитивне науке су покренуле револуцију у интердисциплинарном истраживања људског ума, али се културна антропологија као једна од оснивачких дисциплина постепено повлачила из ове групе. Разлози за то су вишеструки, али празно место које је антропологија оставила остаје празно, или испуњено претежно психолошким или садржајем културних неуронаука. Последњих година, развој психологије, неуронауке и студија вештачке интелигенције (конструктивистички преокрет) довео је до поновног позива да антропологија допринесе својим налазима интердисциплинарном разумевању људског ума и спознаје кроз културу. Овај помак је очигледан у области перцепције животне околине и простора, која је кључна за разумевање концепта стварности. Циљ рада је да представи налазе компаративне анализе класичних антрополошких теорија и новонасталих теорија у другим когнитивним дисциплинама у вези са овом темом, с посебним акцентом на неуронаукама. Шири циљ је да се истакне важност преиспитвања категорија научних дисциплина и раздвајања природе и културе као дистинктивне поделе, а такође и да се допринесе попуњавању празнине у антрополошкој литератури о овој теми која постоји већ деценију.

Кључне речи: когнитивне науке, конструктивизам, антропологија, култура, окружење, стварност

Primljeno: 15.04. 2024.
Odobreno: 15. 06. 2024.