

Cosmography and cognition

PhD Dissertation

Theses

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2009

1. Objectives

The study sets the utilization of neuroscientific knowledge in the examination of the maps of the early modern mapmaking period as its fundamental purpose. The main question and the objective of this investigation is to find the way for this knowledge to assist us in analysing the formal attributes of the maps of the Renaissance and of some of their important and peculiar characteristics: the diversity of the map compositions of the time, the pictorial aspects of the maps, the contents of the maps at the episodic level, the rich and diversely figurative representations of the maps, the collections of the maps and the issue of the cartographic symbols.

2. About the accomplishments of cognitive neuroscience

In order to analyse the maps of the time the study delineates those neuroscientific research results that are relative to the processes of the nervous system and significant for seeing pictures.

It discusses the organization of the visual system in detail, its parallel, distributed and hierarchical nature – from the levels of processing of the elemental visual qualities to those of the object details, of the objects and the groups of objects as well the levels of processing on an episodic one.

It further delineates the theories and the results of perceptual categorization and its research the results. It also presents the theories concerning the processing of visual information through visual pathways. Then it gives a brief summary of the important results of the research done on mental imagery and visual attention..

Also, it devotes a section to the presentation of the functional organization of the hippocampal complex and to that of the recent theories aiming at it. It outlines the hierarchical and distributed nature of the neural processing of the spatial information.

Then the two forms of memory, the episodic and the working ones, their major attributes and the issue of their localization in the nervous system get to be discussed respectively in detail.

3. Maps as external cognitive tools having been produced in the evolution of human culture

This chapter of the study is devoted to the presentation of Merlin Donald's theory of cognitive evolution, which interprets the appearance of tools of communication and that of the entire human culture from a cognitive perspective. According to his theory human culture, mind and cognition jointly developed.

Donald identifies three major transitions in the course of cognitive evolution, which created three new systematic representational modes of reality. These are the mimesis, the language and the symbols and, in accordance with the theory, it is these that have been provided frameworks for the subsequent steps of cultural evolution.

The dissertation elaborates further on the third transition and its three major innovations: the visuographic symbols, the theoretical thinking and the forms of external memory. As the Donald-theory has it, the external storages form an integral part of the human cognitive system. They are inherently cognitive and altered the role of the biological human memory. Donald emphasizes that the working memory theories do not take account of these external tools of memory.

The chapter also touches upon two vision researchers', Margaret Livingstone's and Semir Zeki's works, which involve analyses of the works of pictorial art conducted on the basis of the most recent knowledge on the visual system. Both analyses accentuate the visual compositions of paintings and the visual processing system being closely interwoven. Livingstone introduces her ideas about those visual attributes of the early stages of the visual system that determine pictorial compositions while Zeki does his about the function of the visual system and that of the art works being identical in terms of their cognitive aspects. This function is about the procurement of the knowledge about the durable and permanent nature of things in the world. From a cognitive perspective art can be defined as the extension of the functions of the visual brain.

4. Suggestion for a neuroscientific concept of the maps

Maps are external tools of such cognitive functions as form, object and spatial vision, the memory processes as well as the perceptual categorization. They can be examined, therefore, on the basis of the knowledge relative to the neural organization of these functions. This map concept is versatile; it involves the idea of maps as supporting external surfaces of seeing, perceptual categorization, working memory tasks and image constructions. It is this concept with which we interpret the formal nature of maps in the period of cosmography. Definitions of cosmography and geography. Views of humanist scholars of the period on the nature of maps. Presentation of the close connection between map-making and painting.

5. About the cognitive analysis of the maps of the time

The diversity of the cartographical representations of the time – the interpretation of this phenomenon on the basis of the hierarchical structure of the visual processing system organizing the visual information.

Typical modes of visual compositions in maps through analysis of map examples: episodocity; maps as landscapes and as being independent of the scale; the equality of imaginary modes.

The analysis of atlas maps.

The instances of pre-episodic cartographical representations.

The important cognitive characteristics of the map representations of the period: the task of form representations of the geographical territories; the furtherance of emerging the visual concepts of the contents, mainly lands, of the maps as instances of those concepts.

The unresolved scientific problems of the maps and map forms of the period: the diversity of the cartographical representation; the lack of standardization; the scarcity of cartographic keys. The findings of the research done by C. Delano-Smith on a historical basis.

The study suggests an interpretation of these problems and questions using those cognitive tools have been delineated.

6. About the relationship between various map forms and the visual aspects of personal physical experience of the space

Comprehension and interpretations of the maps in the period. Pictorial modes promoting this comprehension. Vision with maps as a cognition based upon formal visual nature of things. The visual aspects of personal physical experience as the source of seeing in maps. Paintings and maps assisting the transition to this new kind of vision.

7. About the conceptual tools of the period supporting the comprehension of the concepts maps and atlases as new cognitive tools.

The analysis of atlas allegorical title pages and the figurative representations of the maps with the help of cognitive linguistics. The presentation of these tools including the metaphor, the metonymy and the conceptual integration or blending.

The study suggests that the figurative contents of maps and atlas allegorical title pages were comprehended in the period basically by four conceptual metaphors.

Revealing the role of these metaphors in composing map cartouches and atlas title pages through numerous examples. These conceptual metaphors are as follows: an ATLAS is a THEATRE; the MIND is a BUILDING; a [Map] CONSTRUCTION is BUILDING; KNOWLEDGE is VISION.

7. Transition to a new cognitive mapmaking period

The map-structuring conceptual framework of the space with episodic contents narrows down to a peri-episodic level. The suggested causes of the transition: the metric aspect of the cartographical representation and the relief representation as the major tasks come to the forefront; the solidification of the concept of the maps as cognitive tools.

The pictorial and formal characteristics of the transition; the issue of cartographical symbols; the new representative demands of thematic content of maps.

8. Results

Based upon the knowledge of cognitive neurosciences a new kind of map concepts can be introduced and with this several essential attributes of map representation – such as the image character, the diversity of map composition, the importance and equality of events and stories as map contents - can be analysed and defined. The cognitive method makes it possible to describe the map as a new cognitive tool which emerges from the personal experience of the space and of the events in the environment.

The method gives opportunity to solve some riddles of map compositions of the period.

The method makes it possible to define the figurative representations typical of the maps of the period in a unified conceptual frame.

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