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Editorial

To Be Here or Else Where?

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Editorial

Disorientation is a common psychiatric symptom. When diagnosed, it is not often studied specifically as a central symptom, though it might be the manifestation of a fundamental disturbance, probably impacting other high-order cognitive abilities. Analyzing disorientation states might help understanding both an impaired cognitive process and its emotional repercussions. Here we encourage a phenomenological approach of some psychiatric diseases, such as schizophrenia or autism, based on the assessment of spatial orientation impairments. It might provide a valuable description of how to tackle specific symptoms, their associated handicaps and how to start rehabilitation procedures.

Spatial orientation combines emotional dimension with objective cognition.

Spatial memory provides security in allowing efficient adaptation strategies, which might reduce anxiety and favor curiosity. Being disoriented triggers an intense anxiety and active logical thinking. Just think of how you feel when realizing that you are driving Eastward on the Highway, while entirely convinced to aim at a western city! Moreover, spatial memory integrates emotional components during the exploration of a new environment with more objective geometric processing. Such an integration of subjective and objective information has been proposed to ground spatial mapping in cortico-hippocampal networks [1]. This «dual map» combines the integration of a continuous dynamic flow of subjective information in a bearing map with local and static sketch maps of topological features. The first map develops while subjects are moving along a diversity of gradients, be they distance from the secure start positions (coding the reduction of security feeling in metric path integration vector), feeling of effort along slopes, olfactory or thermic gradients. These bearings contribute to subjective emotional feelings and, by the same token, they provide a network of directions for continuing exploration and anticipating changes in yet unvisited regions (warmer or more insecure). More static representations or sketches provide topological cognition of specific positions, based on all centric processing (i.e., coding an integrated "spatial configuration" from the relative positions of various landmarks). The functional properties of a cognitive spatial map thus emerge from the combined activation of two mapping processes in aphylogenetically older and most recent brain regions.

From Animals To Humans

Recently, Gallagher [2] reviewed «broadly embodied, phenomenological and evolutionary conceptions of the origin of mathematics», supposedly a cold logical ability. He relied on a concept of a «pragmatic affordance space», i.e., a construct participating to the basic body scheme, possibly defined as a dynamic interface relating the different parts of the body to each other and to the immediately nearby environment. Gallagher aims at focusing how life experience based on the enaction concept, first articulated by F. Varela), «gains the realm of abstract conceptual thought, and specifically mathematics». Specifically, the development of vertebrates requires not only a memory of actions, but also a memory of how these actions relate different parts of the body with different regions of the immediate environment. These embedded «space fragments» must be articulated to one another, to allow coherent adjustments. In other words, to guarantee the success of anticipatory hypotheses based on the principle of efferent copy [3]. This view leads to a process centered view of brain functions – or pathologies – instead of a structure centered view, certainly better aimed at approaching psychiatric pathologies. The same can be applied to spatial orientation, a geometrical concept.

Comparable Testing Procedures

The brain structures mediating spatial performance can be traced from rats to monkeys and humans (e.g. taxi drivers, for example), suggesting a continuous evolution of information processing through the phylogeny. From this and from a vast body of ecological studies, it appears that spatial orientation can be compared in humans and in animals. For our purpose, the advantage of this generalization is that tests can be conducted without the necessity to require verbal information. Recently, we published a methodological paper describing procedures adapted from radial mazes commonly used in laboratory rodents to test human subjects [4]. It allows the discrimination of specific cognitive deficits by highlighting the use of specific spatial strategies. Indeed, different behavioral strategies can be used to solve spatial tasks. Some are considered as reactive, as for example visual guidance; they require continuous perceptual feed-back. Others, based on the use of a cognitive map, are proactive and enable anticipation of what will be met in the environment without requiring the presence of the whole initial perceptual information. The use of a specific strategy can thus reflect the underlying cognitive process and reveal specific cognitive deficits in psychiatric pathologies, in a ginger following lesions of different cerebral structures [5-7].

Most often, spatial assessment is based on the final performance and on the global efficiency (error rate). Here, to detect qualitative differences when various strategies lead to similar performance, we insisted on how each individual solves the task by identifying intentional biases toward a certain type of cues. Different mazes are presented; the tests are easily conducted by clinicians, even in limited spaces. They were developed in both real (providing

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possibilities for action that depend on both body and environment) and virtual environment. Our aim was to provide tests to observe how an individual interacts ("enacts") with his environment, which somehow reveals the way he experiences it. Schizophrenia patients' speeches reported in the paper of Hulas and Mishra [8] are good examples to illustrate how our tests would highlight their particular way to perceive their surrounding environment. They express to have a difficulty to perceive a scene as a whole (in its entirety) accompanied by an enhanced attention towards all the details constituting the scene. Our maze tasks allow to reveal both enhanced attention to visual details (reflected by the use of compensatory reactive strategy to discriminate places in the maze) and the difficulty to integrate and organize multimodal perceptual information into a global representation (reflected by an impaired capacity to discriminate places in a condition where only a strategy based on cognitive mapping is efficient).The advantage of identifying preserved or better-expressed spatial abilities and compensatory adaptation is that it provides additional information as how this capacity is affected. This initial behavioral assessment can then be completed by subjects' verbal self-assessment (strategy they think they used or what they felt when solving the task, difficulty of the task). This emphasizes the gap between what the subject really knows and what he thinks he knows or doesn't know, an additional valuable qualitative description of his experience. All together, this information might help clinicians to propose adapted behavioral rehabilitation.

References

1. Jacobs LF, Schenk F. Unpacking the cognitive map: the parallel map theory of hippocampal function. Psychological Review. 2003; 110: 285-315.
2. Gallagher S. Doing the math: Calculating the role of evolution and enculturation in the origins of geometrical and mathematical reasoning. Progress in Biophysics and Molecular Biology. 2015.
3. Friston K. Prediction, perception and agency. International Journal of Psychophysiology. 2012; 83: 248-252.
4. Bertholet L, Torres Escobar M, Depré M, Chavan C, Giuliani F, Gisquet-Verrier P, et al. Spatial radial maze procedures and setups to dissociate local and distal relational spatial frameworks in humans. Journal of Neuroscience Methods. 2015. [In Press].
5. Cocchi L, Bosisio F, Berchtold A, Orita A, Debanné M, Wood S J, et al. Visuo spatial encoding deficits and compensatory strategies in schizophrenia revealed by eye movement analysis during a working memory task. Acta Neuropsychiatrica. 2009; 21: 75-83.
6. Giuliani F, Schenk F. Vision spatial cognition and intellectual disability Research in Developmental Disabilities. 2015; 37: 202–208.
7. Grand champ N, Schenk F. Adaptive changes in a radial maze task: Efficient selection of baited arms with reduced foraging in senescent hooded rats. Behavioural Brain Research 2003-2006; 168:161-166.
8. Uhlhaas PJ, Mishara AL. Perceptual anomalies in schizophrenia: integrating phenomenology and cognitive neuroscience. Schizophrenia Bulletin. 2007; 33: 142-156.

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