Importance of triangulation in verifying semblance hypothesis

Kunjumon Vadakan

Semblance hypothesis used constraints offered by disparate findings from various levels to arrive at a suitable structure-function mechanism for the nervous system functions. Now it is necessary to verify this using triangulation methods.

https://www.nature.com/magazine-assets/d41586-018-01023-3/d41586-018-01023-3.pdf

In this effort, the following findings can be used. An extensive list of findings from various levels and the constraints offer by then can be found on **Table 1 on the first page** of this website. Some of the examples are given below.

1. Using findings from normal conditions

a) Changes occurring at physiological time-scales during learning should allow induction of units of first-person internal sensations at physiological time-scales. b) Learning-induced changes should exhibit a range of life-spans so that it will become possible to explain how working, short-term and long-term memories can get retrieved. c) Since majority of our memories are working memory, it is expected that majority of learning induced changes get reversed back quickly.

2. Findings from loss of function conditions

a) Correlation coefficient of nearly 0.997 between effectiveness of anesthetic agents and their lipid solubility (https://www.ncbi.nlm.nih.gov/pubmed/19494779), loss of consciousness by anesthetic agents, and neurodegenerative changes by repeated use of general anesthetic agents. It is necessary to find an inter-connectable (to triangulate) explanation for these findings. b) Valproic acid is effective in alleviating symptoms of unrelated diseases such as headache, seizure disorders, and certain choreiform movement disorders. Unless there is a deep underlying common mechanism, this will not become possible. Therefore, ability to triangulate these findings through a common central mechanism can be used to verify the derived mechanism.

3. Findings from experimental results

Long-term potentiation (LTP) is an experimental finding that has shown several correlations with the ability to learn. In order to explain this correlation, the actual mechanism should be able to explain the following. a) What is the reason for the need for high energy to induce LTP? b) Why there is a delay of up to 20-30 seconds for LTP induction after stimulation, even though normal learning has only milliseconds of delay? c) Why there is a sudden drop in peak-potentiated effect?

The structure-function mechanism derived by semblance hypothesis has allowed triangulation of large number of findings https://www.biorxiv.org/content/early/2016/11/12/087353

Due to these reasons, semblance hypothesis is a further testable hypothesis.