

## Precuneus and Memory

To make this article easy to understand, *the words of our master Thích Thông Triệt are written in blue, the research results of the scientists in brown and the author's comments in black italics.*

With every new experience, our brain is faced with a difficult task: It must be flexible enough to absorb new information in a short time, but also stable enough to store it for a long time. In addition, new memory content should not overwrite or change old content. The brain solves this task by storing memory content in two separate memories: in the hippocampus, a plastic short-term memory with a large capacity and fast absorption capacity, and in a part of the cerebral cortex known as the neocortex. Previous evidence suggests that many learning repetitions after initial encoding into hippocampal circuits are considered necessary for memory to become established in a long-lived neocortical store. The interaction between these two systems (the fast-learning hippocampus and the slow-learning neocortex) has traditionally been considered very slow, taking weeks or months to establish a neocortical memory trace. **Although the neocortex absorbs information more slowly, it protects it permanently and without overwriting other content (1).** However, the role of the neocortex in memory and how these two regions interact with each other was largely unknown. In 2016, researchers from the Institute of Medical Psychology and Behavioral Neurobiology at the University of Tübingen, together with scientists from Munich, have now investigated how these two systems work together during learning (2).

*In their new study, the research team placed test subjects in a virtual maze on the screen, in which they had to find hidden objects.*

The longer the test subjects moved through the maze, the better they got to know its structure and the positions of the objects. While the study participants performed this spatial learning task, their brain activity was recorded using magnetic resonance imaging (MRI).

The researchers used a trick to identify the areas of the brain responsible for spatial memory: In one part of the experiment, the maze was unchanging, allowing the participants to gradually build up a spatial representation in their memory. In a second part, the maze was constantly changing so that the test subjects were unable to recognize or learn anything. The comparison of the tomographic images from these two mazes reveals which brain regions contribute to the formation of spatial memory. The result shows that the activity of the Precuneus, a region in the posterior Neocortex, increased continuously with learning, whereas the activity in the Hippocampus decreased continuously. Communication between the two regions also continued to decline over the course of learning.

The result indicates,

-that the long-term, neocortical memory traces are already formed when new information first arrives.

-that the Hippocampus is no longer involved in learning after such a short time.

The number of learning repetitions apparently has a decisive influence on how quickly a long-term and stable memory is formed in the Neocortex.

This study shows: "**As soon as new information is available, an independent long-term memory trace is formed in the Neocortex (in the Precuneus)**".

*So, when the participants looked at the change in the maze, the visual information entered the visual Cortex and from there into the Precuneus region, initially the information also entered the Hippocampus, but due to the increasing familiarity with the*

information, the "remembering the facts" is less and less necessary, so later the visual information enters more and more into the Precuneus and less and less into the Hippocampus.

A study on mental navigation tasks showed that the Hippocampus was only activated when the study participants had just arrived in a new city, but not when they had lived there for a year, showing activation in the posterior Para-Hippocampal Cortex, the Precuneus and not the Hippocampus (3).

This means that in studies in which the learned information is familiar through repeated repetition and there is no longer any effort to remember this information, neocortical areas such as the posterior parietal cortex (Parietal Cortex with the Precuneus region) are activated. And these are the prerequisites for the formation of cognitive insights, as Nun Triệt Như taught us in the courses (Fig. 1).

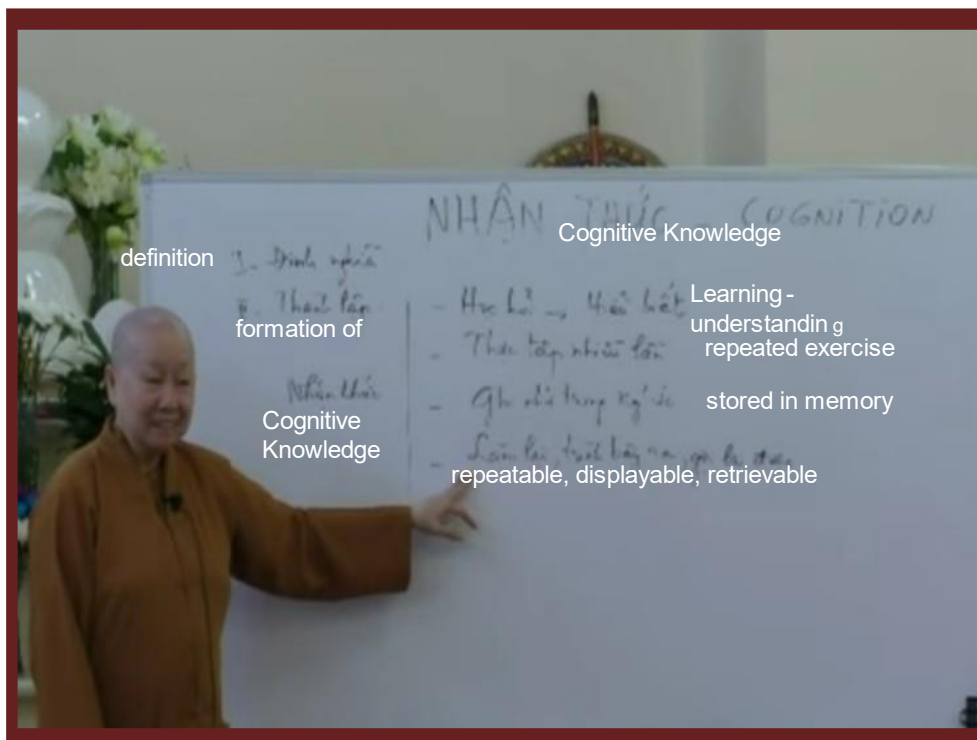


Fig. 1

Since 2006, researchers Dr. Erb and Ranganatha Sitaram, Department of Biomedical Magnetic Resonance at the University of Tübingen, have worked with Master Thich Thong Triệt for many consecutive

years to study his brain during meditation in an MRI scanner. The results show activation from the Precuneus region when a deep state of meditation occurs. In July 2011, during the "Buddhist Psychology" course, he said about the importance of this Precuneus region, for example:

<<The Precuneus area is considered the episodic memory area>> or <<Precuneus is the spiritual relay station, the fourth relay knot, the place where spirituality comes out and takes the initiative in everything>>. I remember the time when Master Thich Thong Triệt declared his intention to do a one-year retreat (2012) to experience inwardly himself about this Precuneus region. During the course in Germany in June 2013, I heard the assertion from him: <<Tathā spirit is synonymous with the Precuneus region>>. *This is a statement that is ahead of science and must have been a discovery of the Master during his retreat in 2012.*

Also in September 2013, he published a documentary script on the **technique and function of abiding in the Tathā mind**, in which he clearly stated this (Fig. 2a and Fig.2b):

**TATHĀ spirit  
matching terms**

- ▣ **The unborn**, corresponds to the Buddha's discourses in Pāsarāsisutta - The Noble Quest.
- ▣ **Nibbāna**, according to the teachings of the Buddha in the Nikayas (Pāsarāsisutta - The Noble Quest).
- ▣ **Not-self** that the Buddha realized in the state of suchness of mind (Anattalakkhaṇasutta - The Characteristics of Not-self)
- ▣ **Buddha-nature**, in Phật tính luận (sa. buddhagotra-śāstra) by Vasubandhu and in Mahāparinibbānasutta by Mahayana
- ▣ **Real nature**, Hui neng, the sixth patriarch of Chan Buddhism .
- ▣ **The unborn**, Master Bankei
- ▣ **Precuneus**, in western neurology

Fig. 2a

## PRECUNEUS - TATHĀ SPIRIT = BUDDHA SPIRIT

### 1. PROPERTY:

Self-cognitive awareness. Suchness of mind (Buddha). Buddha nature = Buddhatā (Mahayana).

### 2. LOCALIZATION:

Parietal lobe – cortex

Brodmann divided the brain into 52 regions. Precuneus is region "BA 7"

### 3. FUNCTION:

- Connects 3 switching stations to create a silent network of all regions in the brain and cortex.
- Central core of the brain.

### 4. ROLE:

- Active role in all human activities.
- Predisposition to spiritual wisdom.
- Helps to harmonize body and mind.
- Promotes creative abilities.
- Helps to experience release from suffering, enlightenment and liberation.

Fig. 2b

*The technique for abiding in the Tathā mind is therefore based on the continuous activation of Precuneus, as the master explained: << Save " Don't Talk" ("D T") in the Precuneus area sufficiently so that later we only must evoke the two words " Don't Talk" to be able to enter Samadhi immediately>>.*

*And here I understand " Don't Talk" as the information about the knowledge gained through practicing the " No Talk" meditation method. This learned information should be familiarized in the brain (as cognitive knowledge) through constant, relaxed repetition of " Don't Talk", this information of this knowledge will then enter the Precuneus area and be memorized there, << so that later we only must evoke the two words " Don't Talk" to be able to enter samadhi immediately>>. Of course, with other meditation methods, such as Breathing Meditation... the constant repetition of the exercise also becomes just as necessary.*

*I am also gradually beginning to understand his ideas, although it is too late because he is no longer alive. Thanks to the studies that*

*scanned his brain with an MRI machine during meditation, he realized the connection between the Tathā mind and the Precuneus, and then he spent all his time and effort until the end of his life perfecting the "No Talk" based meditation method according to this realization.*

In the documentary script on the **technique and function of abiding in the Tathā mind**, he also explained the technique of using the meditation method of No Talk to be able to abide in the Tathā mind.

Let's look at step 1, phase 1, again (Fig.3): According to the diagram (Fig. 4), *<<if we hum two words " Don't Talk" softly just for us while listening to stimulate the nature of hearing>>*, according to Master Thích Thông Triệt, the signal from the "Nature of Hearing" area will go directly to the Precuneus region (this was later found in 2016 by scientists (Svenja Brodt et al.) in the study of spatial memory formation). In this diagram (Fig. 4), he did not mention about the role of Hippocampus. *So, this signal of awareness of "D T" from the first stage is stored directly in the Precuneus region.*

**EXERCISE TECHNIQUE: LINGERING IN THE TATHA -MIND**  
Phase 1: Sensory memory  
Formation of a code memory of "don 't talk"  
consists of 4 steps:

**Step 1: We say "don't talk" as 2 words** to activate the nature of hearing

**Exercise technique:**

- 1. Hum/pronounce:** "Don't talk" quietly, just loud enough for us to hear it ourselves. The interval between the two words "Don't" and "Talk" should be about 10 seconds - like the sound of the gong.
- 2. Say silently in your head:** "...Don't ... talk"... "Don't ... talk"...

Both exercise techniques serve to strengthen our awareness like that of an enlightened and awakened intellect.

Fig. 3

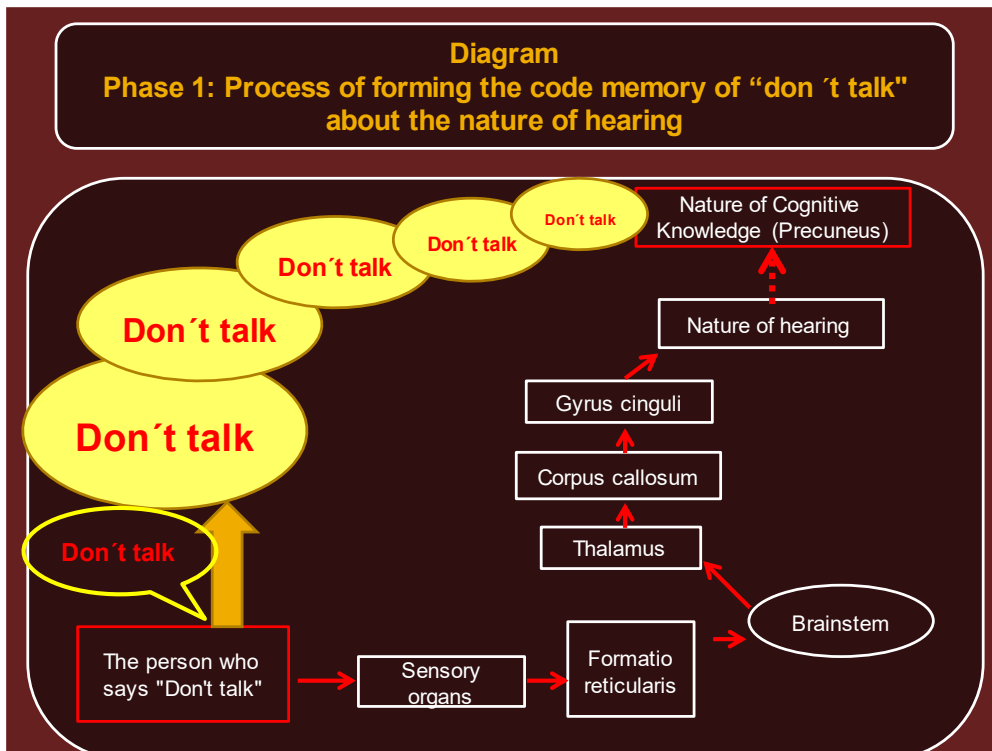


Fig. 4

*I remember when I saw the diagram on the blackboard during the meditation course in Germany in June 2013, I briefly thought, how can these signals of awareness of "D T" go directly into Precuneus without going through the hippocampus (Fig.5)? Only later I realized that if we practice "D T" while trying to remember with effort, the "D T" signals will enter the Hippocampus, but not the Precuneus region! It could be that the Master recognized the key point in the story of the Buddha as a child during Thanksgiving retaining the signals of awareness of breathing as he sat breathing in the cool shade of a rose apple tree (4)?*

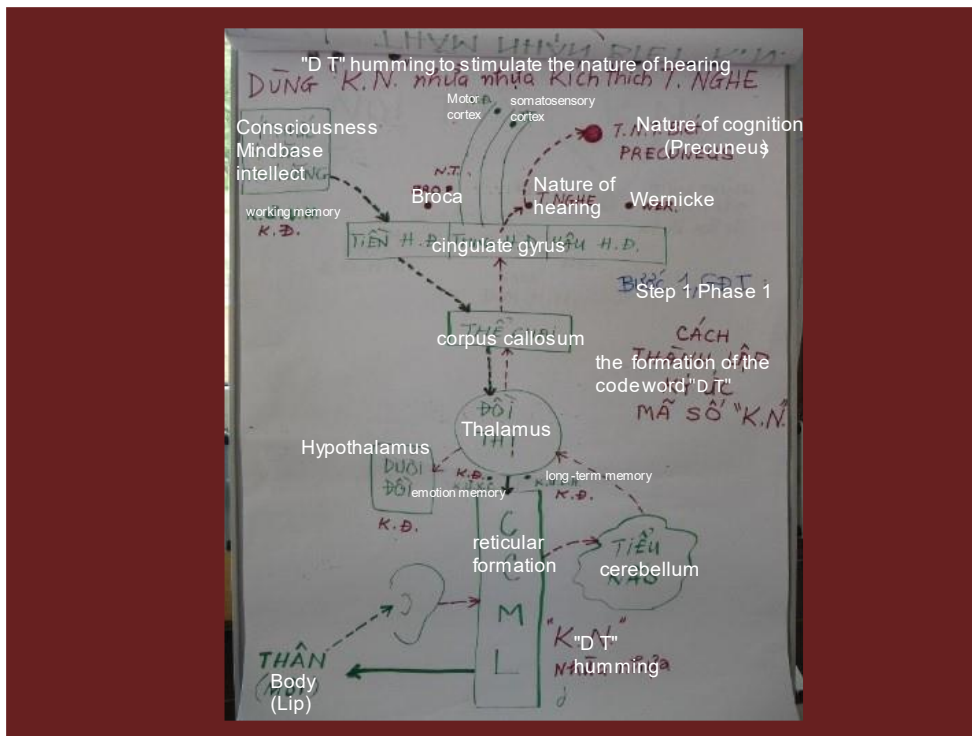


Fig. 5

*And if we want to store it in the Precuneus realm (or in the realm of "nature of cognitive awareness"), this storage must take place "without thinking about it", quite naturally, in "complete seclusion from the pleasures of the senses" (5), without effort or expectation in it. In this step, it is only necessary to listen (with the nature of hearing) so that this "D T" signal is stored naturally in the Precuneus area without us trying to store it. In my own experience, if we listen to "D T" naturally and without thinking, listening to "D T" wholeheartedly, this practice will be simple and easy, gentle, yet effective. However, listening here is not "ignorant" listening (careless listening) ("D T" not humming and listening carelessly like a parrot), behind this step is a whole process of building up knowledge about the nature of hearing to form insight from it.*



**EXERCISE TECHNIQUE: LINGERING IN THE TATHĀ -MIND**  
**Phase 1: Sensory memory**  
**Formation of a code memory of "don ´t talk"**  
**consists of 4 steps:**

**Step 2: In walking meditation, we apply the single thought of awareness in saying "don ´t talk" to activate the nature of touching**

**Exercise technique:**

- The left foot touches down and says "Don't", the right foot touches down and says "Talk".
- We walk calmly, use the correct walking meditation technique.

**Exercise duration:** 1 to 2 weeks

**Effect:**

- Stimulate the nature of touch.
- Balance hormones in the body, regulate inner energy, restore memory.

Fig. 6

**EXERCISE TECHNIQUE: LINGERING IN THE TATHĀ -MIND**  
**Phase 1: Sensory memory**  
**Formation of a code memory of "don ´t talk"**  
**consists of 4 steps:**

**Step 3:**

**Exercise technique**

- **We see the two words "Don't talk".**
- **We apply the single thought of awareness when reading out "Don ´t talk" to activate the nature of seeing.**

**Exercise duration:** 1 to 2 weeks

**Effect:**

- Stimulate the nature of seeing.
- Isolation of the anterior part of the cingulate gyrus (i.e. isolation of the thought network).
- Isolation of different memory areas: (a) working memory, (b) emotional memory, (c) long-term memory.
- Balancing hormones in the body, regulating internal energy, restoring memory.

Fig. 7

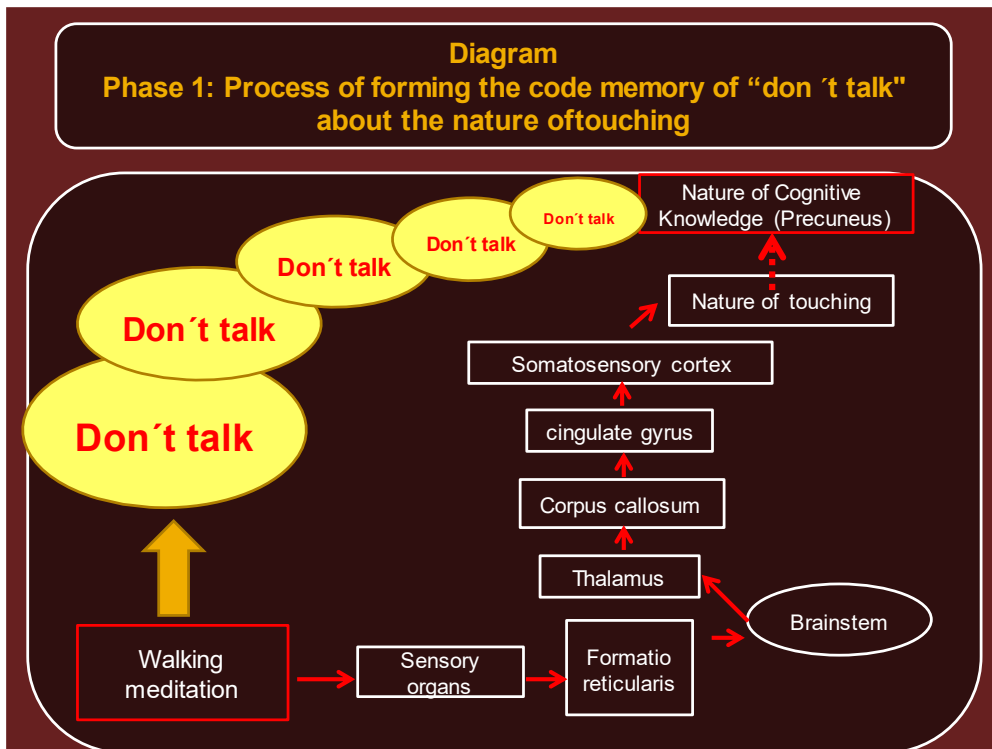


Fig. 8

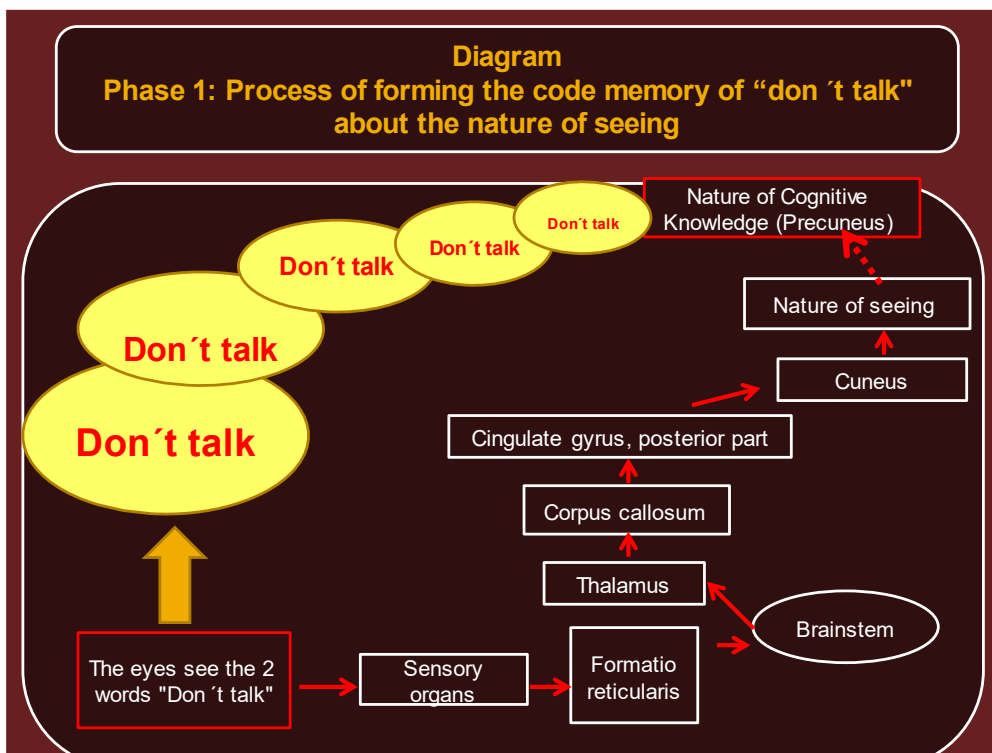
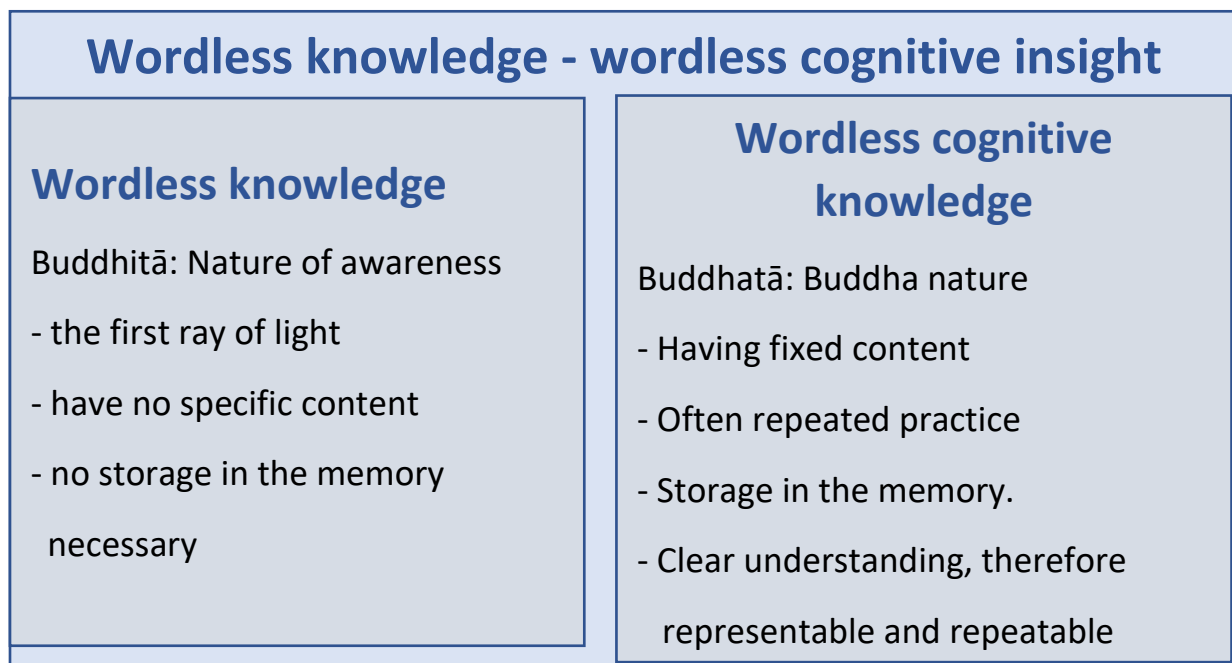


Fig. 9

Step 2 and Step 3, Phase 1 (Fig. 6 and Fig. 7), according to the diagram (Fig. 8 and Fig. 9), the signal from the "nature of touching" or "nature of seeing" area goes directly to the Precuneus area, in these diagrams he also does not mention anything about the role of Hippocampus.

The result of the first stage is the isolation of the network of perception (includes network of verbal, non-verbal impressions, ideas, associations). When these steps are successfully completed, there will be the meditation stage (avitakka avicāra samādhi) free of thought and discourse. The purpose of this stage 1 is to give commands to the brain to store them in the realm of the nature of cognitive awareness (Precuneus) so that they can only be evoked in the second Jhāna.

*Here we see that he clearly defined the purpose of phase 1: to store the "D T" signal in the memory area of the nature of cognition (or Precuneus) (Fig. 10)*



(Fig. 10) Diagram of the Nun Triệt Như

The key to staying in the Tathāgata-Mind is therefore a solid non-verbal awareness that is kept in the Precuneus through the repetition of a topic. *In the above-mentioned study by scientists (Svenja Brodt et al.), the learning content is a sensory vivid topic: "Spatial learning of the labyrinth", therefore the number of repetitions is not much needed. But here, the knowledge of "D T" (and not the word "D T" as the subject is as I mistakenly thought in the past) is an abstract subject, how to make it become a clear reality in the mind, then from this knowledge of "D T" can be developed into the awareness of "D T", therefore, a longer continuous repetition is of course very necessary.*

A lit incense stick in honor of Thày.

Minh Tuyèn, January 2023. English translation by Klaus Bräuer

- 1 <https://uni-tuebingen.de/universitaet/aktuelles-und-publikationen/newsfullview-aktuell/article/die-grosshirnrinde-lernt-von-anfang-an-mit/>
- 2 Svenja Brodt, Dorothee Pöhlchen, Virginia L. Flanagan, Stefan Glasauer, Steffen Gais, and Monika Schönauer: Rapid and independent memory formation in the parietal cortex. *Proceedings of the National Academy of Sciences (PNAS)*, DOI 10.1073/pnas.1605719113.
- 3 Hirshhorn M, Grady C, Rosenbaum RS, Winocur G, Moscovitch M. The hippocampus is involved in mental navigation for a recently learned, but not a highly familiar environment: A longitudinal fMRI study. *Hippocampus*. 2012;22(4):842–852.
- 4 Majjhima Nikāya, Bodhirājakumāra Sutta, 85. An Prinz Bodhi.
- 5 Aṅguttara Nikāya, Das Vierer-Buch, 4.41. Wie man Versenkung weiterentwickelt.