Ecomindsponge theory: positioning humans in the ecosphere

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A demand for a theory connecting humans and nature

The human brain is a highly advanced biological organ, allowing for remarkable information processing capacity. Having this advantage compared to other species on Earth, humans can have huge impacts on the environment and each other. We have built civilizations with rich cultures and countless innovations. Humanity often takes pride in the ability to form a highly ordered society with multiplex norms and artificial laws. People also tend to believe that the power of creativity is what makes humans a unique species; in fact, so unique that many people view the human world as a separate space compared to the natural world. But what are we in relation to the Universe, particularly the Earth? And how much power do we really have?

Humans are causing severe environmental damage within the ecosphere, leading to the ongoing Sixth Mass Extinction [1,2]. These impacts harm not only other living beings but also human well-being and even the survival of our species. When a species is destroying its own habitat and displaying chronic self-harm behaviors, there is a major issue with its information processing system. Why are we doing this despite all the available knowledge and the capacity of the central nervous system that is better than any other species on Earth? On a fundamental level, where does it go wrong?

The mindsponge theory [3] offers a novel approach and an effective framework for exploring the nature-human relationship, down to the deepest levels of information exchange and system interactions. However, the mindsponge theory in its general form lacks a conceptual boundary that helps increases its applicability when examining human thinking toward nature. The human brain and society are much more complex than other species on the planet. It is helpful to draw analogies from other organisms, but the human mind's activity still needs to be considered in a higher-level framework. Besides, we have not known of any other types of advanced processing system on an equal level to the human mind. Thus, a special approach to studying human subjectivity is needed since direct comparison to another system is largely impossible.

Therefore, we propose the theory of ecomindsponge to focus on examining the human information processing system in relation to the Earth's ecosphere. This can help in the quest of knowing where we stand in this Universe and the basic mechanisms of how we interact with the natural environment.

Ecomindsponge theory

This section provides the general definition and explanation for the ecomindsponge theory. Generally speaking, ecomindsponge is an information-processing approach to thinking about the position and functions of humans in the Earth's ecosphere and how we interact with nature through our subjective perceptions. The term ecomindsponge is generated from two words, 'eco' (which stands for the Earth's ecosphere) and 'mindsponge' (which refers to the information-processing approach of thinking).

The ecomindsponge theory has two fundamental concepts, which help understand the human position in the ecosphere and how we interact with the environment around us. They are:

1. The objective sphere of influence
2. The subjective sphere of influence

The objective sphere of influence demonstrates the physical relationships between humans and other components of the ecosphere (including other humans). The concept is based on the Weak Anthropic Principle [4]. We start with the assumption that the Earth's ecosphere is a tremendous natural information-processing system, and a human is a part of such a

system. Our existence is not only affected by other information processors and information in the surrounding environment but also affects them through our responses to the environment (e.g., behaviors). The interactions between humans and their surrounding environment in the physical world can be deemed objective, and bounded by the Earth's parameters, constants, and laws; thus, they have certain limits. For example, a human cannot survive for too long with a severely dehydrated body or in anoxic conditions. Such interaction boundaries are deemed as the objective sphere of influence.

Most human responses to the surrounding environment are consciously or subconsciously driven by their minds, defined as information collection-cum-processors [3]. Viewing the mind as a collection of information is too general. It hinders the more in-depth study of the mind's interactions with the surrounding environment, so the subjective sphere of influence is proposed to overcome this limitation. The subjective sphere of influence demonstrates the boundary of interactions among information existing within the mind (or the subjective world). Such information consists of both information absorbed from the external environment through sensory systems and stored within the mind. In a sense, the subjective sphere of influence reflects the objective interactions that can be perceived and exist as corresponding representations within the mental realm.

In the next section, we will thoroughly explain the construct and function of the subjective sphere of influence and its relationship with the objective sphere.

Subjective sphere of influence

According to the mindsponge mechanism [5-7], the subjective (mental) world is constructed from a set of information within the mind. Information in the mind interacts with each other, forming webs of associations called subjective spheres of influence. The sphere creates the perceived meaning for the objective things corresponding with the information within the sphere. Eagleman's statement supports this assumption [8], "the meaning of something to you is all about your webs of associations, based on the whole history of your life experiences."

Three fundamental components construct the subjective sphere of influence:

1. Information
2. Connection between information

3. The intensity of the connection

Two prerequisite conditions are required to form a subjective sphere of influence. The first condition is the existence of at least two pieces of information within the mind. The second condition is the connection between the two pieces of information within the mind. There are three main types of connection between two pieces of information (presumably, A and B):

- Perceived impact of A on B (AB)
- Perceived impact of B on A (BA)
- Perceived mutual impacts between A and B (AB)

Each connection also has intensity, reflecting the perceived likelihood of the connection's occurrence.

To further explain how the subjective sphere of influence can help a person navigate in the ecosphere, we assume that there exists information representing the 'self' within the mind. This information is special as it reflects the existence of the physiological body and mental construct of the individual in the objective world into the subjective world. It is noteworthy that the information representing the self is not fixed, but it varies depending on each person's mindset and updating mechanism. Also, as the information representing the 'self' is only a projection of the individual's physiological body and mental construct, it cannot reflect the whole body or mind.

Since an individual's mind (as an information-processing system) is bounded by the natural patterns of the biological system, its fundamental purpose is to prolong the system's existence in one way or another, including survival, growth, and reproduction (in both natural and social aspects) [9,10]. Therefore, the information process within the mind (consciously or subconsciously) prioritizes information and information connections that favor the existence of the self, generating the self-affirmation mechanism [11].

Because of this self-prioritization mechanism, thinking processes and behaviors are mainly driven by the subjective spheres of influence concerning the self. There are two types of such spheres:

1. Perceived sphere of being influenced, representing the perceived impact of other information on the self

2. Perceived sphere of influencing, representing the perceived impact of the self on other information.

These two types of spheres exist concurrently and overlap, creating four different scenarios of perceptions.

1. Scenario A (cyan bubbles): the information perceived to be mutually influential with the self
2. Scenario B (light red bubbles): the information perceived to be influenced by the self
3. Scenario C (purple bubbles): the information perceived to influence the self
4. Scenario D (purple bubbles): the information perceived to have no interaction with the self

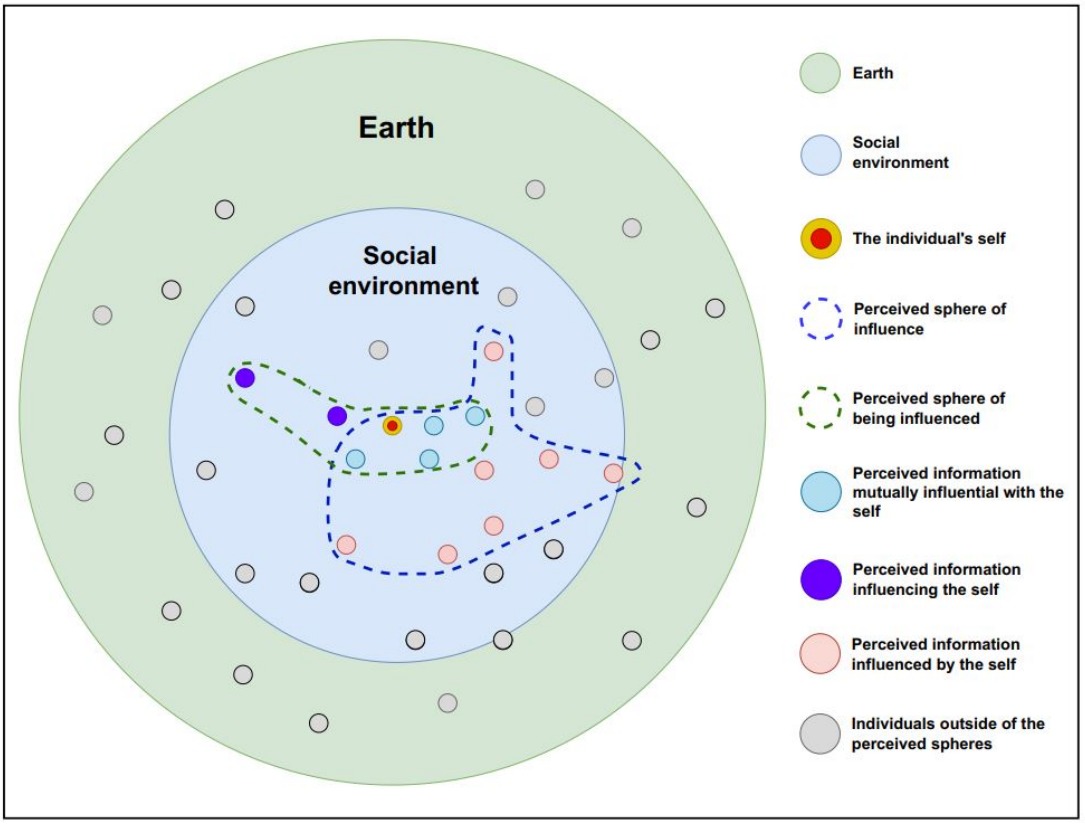

Figure 1 displays the four scenarios of perceptions in the infosphere, with the Earth system being the largest information collection, represented by the green area. Within the Earth is the social environment, where the interactions among humans happen.

The subjective spheres of influence are not only the outcomes but also the inputs of the mental process, supporting the individual to navigate within the ecosphere. On the one

hand, the shapes of the spheres were generated based on the mind's multi-filtering process in the past to maximize the perceived benefit and minimize the perceived cost of the self. On the other hand, they also attribute to the subsequent multi-filtering process of the mind. For example, if an individual perceives that helping friends improve the perceived benefit for him/her (e.g., more friends, better relationship), his/her perceived sphere of influence is more likely to encompass his/her friends and influence the subsequent interactions with those friends. In contrast, if helping friends leads to negative outcomes (e.g., ungrateful responses), an individual's perceived sphere of influence is less likely to encompass his/her friends, reducing his/her interactions with those friends. Following this way of thinking, the information in scenario D cannot exist in the mind because it will soon be ejected from the mind for energy saving if absorbed.

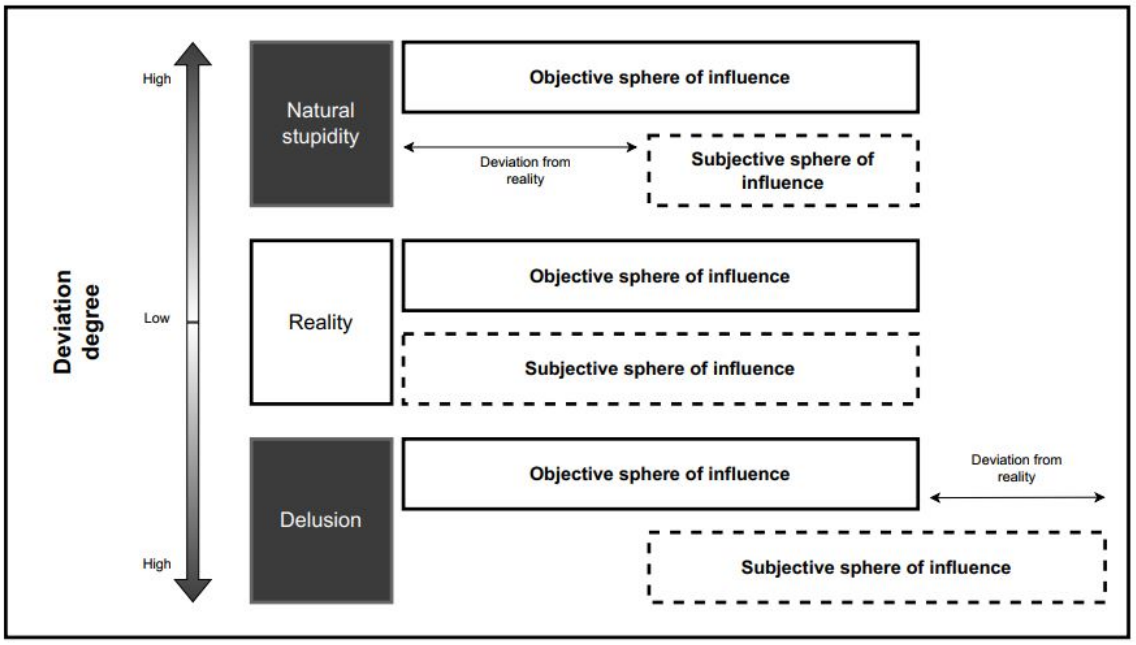

Figure 2: The deviation from the reality of humans' perceptions

The connections within the subjective spheres of influence are mental constructs, so they are not necessarily consistent with the connections in the objective world. The objective sphere of influence is fixed based on the parameters, rules, and laws that govern the Earth's ecosphere. In contrast, the subjective sphere varies in relation to the objective sphere due to the variances in the mental processes of the mind (e.g., absorption and simulation processes). The degree of deviation represents how correct the subjective spheres of influence reflect the objective spheres, or reality (see Figure 2). Generally, there are two types of deviations:

1. Natural stupidity: the state in which the individual does not understand sufficiently how the ecosphere operates around him/her.
2. Delusion: the state in which the individual obtains wrong perceptions about the ecosphere operating around him/her.

Currently, most humans are in a state of natural stupidity. That is why, when being asked during a conference about artificial intelligence, Amos Tversky (1937-1996) answered his thoughts on AI as follows:

"My colleagues, they study artificial intelligence; me, I study natural stupidity."

Culture and innovation through the lens of ecomindsponge

The proposed ecomindsponge theory offers a novel and useful way of thinking to understand and study the position of humans as well as their navigation method in the Earth's ecosphere. In this discussion, we share some thoughts on the promising application of studying the interactions between nature and humans through culture and innovation.

For humans, culture and innovation are two crucial aspects of survival and adaptation [12,13]. Culture helps maintain social order and regulate interpersonal relationships. This allows for relatively safe and stable conditions to raise children and create other delicate human constructs such as morality, academia, arts, philosophy, etc. Innovation helps humans adapt to their living environments and further advance their information processing capacity [3,14]. If applied wisely, this expands the objective sphere of influence based on increasing effective information exchange and adaptive responses.

Through the lens of ecomindsponge, culture can be considered a collective set of trusted values expressed in the form of social norms. It represents all information within the collective subjective sphere of influence that a society bases upon to evaluate any value existing within and coming into the system. Human culture, thus, determines how the majority of humans think of and conduct behaviors toward nature. The direction of collective evaluation is reflected as an eco-surplus or eco-deficit culture [15]. Social norms and the corresponding cultural values change through the natural mindsponge updating mechanism, including reinforcement, compromising, replacement, etc. This process's ultimate goal is adapting, regardless of strategies and whether the outcome is adaptive or maladaptive (e.g., environmentally friendly or destructive). This property can also be seen

in the cultural additivity phenomenon and lie-violence behaviors [16,17].

Culture, as any other human value, is collective knowledge – processed and integrated information. Humans use knowledge to generate changes that are supposed to be useful to their well-being and advancement. This is the nature of innovation. However, the base knowledge comes from nature – the system of which humanity is a subset. Theoretically, there can be no information within the mental realm that does not represent corresponding information in the objective world (note that humanity only knows a fraction of all available information in the environment). The human mind can make analogies from the received and stored information and create derived values. However, if the contents and patterns of thoughts do not follow natural rules, they will not be useful when applied to the real world through intentional behaviors. The usefulness depends on the deviation degree between the mental value and its represented information in the real world. A high degree of deviation is either delusion or stupidity based on the contrast between the subjective and objective spheres.

Expanding the subjective sphere of influence in alignment with the corresponding objective sphere means being aware of a wider range of information exchange. Being aware of more "links" (interactions) can help one gather more knowledge from the external world, which increases the possibility of faster and better innovation (positive adaptation). In other words, by becoming more capable and more aware of that capability, humanity can learn more from nature – the ultimate intelligence that made us what we are [18,19].

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