

## A CONTEMPORARY AND INTERDISCIPLINARY DEFINITION OF THE SELF

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### Abstract

This article addresses contemporary definitions of the self in both philosophical and cognitive neuroscience literature. In this article, I attempt to operationally define the self by amalgamating Gallagher's model of the narrative and minimal self with evidence from both psychological and cognitive neuroscience. Gallagher defines the narrative self as reflecting on past experiences and future endeavors. The narrative self shapes our expectations, beliefs, thoughts, feelings and actions and is susceptible to these beliefs, thoughts, feelings and actions when making decisions. Using this definition, Gallagher describes the narrative self as an ensemble of selves, a forever changing entity, contingent on mood, state and motivation. On the other hand, the minimal self is simply the self in the present objective state, irrespective of a person's memories or future decisions. As Gallagher had described it, the minimal self is composed of the sense of ownership and the sense of agency. The sense of ownership is the acknowledgment of one's own sense of self, which can be understood as a separate entity from non self objects. The sense of agency, however, is the understanding that the individual is the source of an action. In the next section, I discuss the operational definition of the self within the cognitive neuroscience literature. Using these philosophical definitions, I offer a bridge between these perspectives by comparing Gallagher's narrative self with the default mode network.

**Keywords:** narrative self, minimal self, default mode network.

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### The Philosopher's Perspective

When referring to the philosophical perspective, we must first start by asking how the self can be defined. If the self can be defined, what are the prerequisite conditions required to establish a

self? Many contemporary philosophers have contemplated on this issue, often giving varied but sometimes promising suggestions. Recently, Gallagher (2000) has collected varied concepts about the self from many philosophers and cognitivists. Gallagher converged these

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views into two distinguished definitions; the narrative self and the minimal self.

The narrative self is essentially the self we can reflect on when thinking about our past experiences and future endeavors. Of course, it is our past experiences that have predominantly shaped our beliefs, thoughts, feelings and actions to make the person we are, and in turn, we are prone to make certain decisions about the future based on these beliefs, thoughts, feelings and actions. Using this definition, you are a continuous self, varied by assorted feelings and thoughts while consistently changing your mood and state of mind. To put it another way, the narrative self is an ensemble of selves, contingent of the events and moods of an individual.

The minimal self is supposedly more fundamental than the narrative self. The minimal self is simply the self in the present objective state, irrespective of a person's memories or future decisions. The minimal self is essentially the "self, devoid of temporal extension", as Gallagher described it, and is composed of two sense of self subgroups; the sense of ownership and the sense of agency. The sense of ownership is the sense of instinctive understanding that the physical body belongs to the owner rather than to another peripheral entity, while the sense of agency is a sense of understanding that one is the source of its own actions, which no other may voluntarily manipulate.

Although these subgroups of the minimal self seem concrete there is evidence suggesting that the minimal self is not a fundamental definition of the self since the sense of ownership can be influenced involuntarily by our sur-

roundings. This was exemplified in a well-known psychological experiment that demonstrated the sense of ownership being violated. Pavini, Spence and Driver (2000) designed an experiment whereby subjects had to judge the source of vibrating cubes placed in their left or right hand, which were concealed by a lower platform. Simultaneously, a similar display of pseudo hands and cubes with LED lights were placed above the subject's concealed hands/vibration display, meaning that the subject saw a false interpretation of their own hands. For some of the trials, LED lights of the higher cube display would flicker simultaneously with the vibrations of the lower cube display, at other times the LED mismatched the vibrations. This was then compared with a control condition in which the subject did not see the hands display, but just two visible cubes with LED lights. When the subjects were asked to report the vibrating cube, their response time increased with mismatched trials compared to the control condition. In comparison, a second experiment utilized misaligned dummy hands, in which the subject knew that the visible hands did not belong to him/her, and consequently their response time did not differ compared to the control condition. Therefore, while reaction time increased for the mismatch condition when realistic, false hands were visible, reaction time remained the same when subjects saw unrealistic, false hands. These experiments demonstrated that while subjects were unaffected by an obvious false model of their own hands, they were distracted when the hands display was more realistic. Hence the sense of ownership can also be influ-

enced by our surroundings, in this case by misleading visual distractions.

To recapitulate, the sense of ownership can be influenced by our environment in one way or another. From these experiments I argue that the minimal self is a false interpretation of the self since the sense of ownership is susceptible to manipulation. Could this mean that the minimal self requires a consistent sense of self to be considered a fundamental definition of the self? Moreover, can we still assume that the minimal self is a more fundamental definition than the narrative self? Perhaps fundamentalism is not the most efficient way to distinguish narrative and minimal self definitions. If the minimal self is not a false interpretation of the self and the minimal self is in fact the most fundamental type of self, then something is missing to Gallagher's definition. Then again, perhaps an enduring sense of self is not a necessary requirement for defining the self. Or perhaps the minimal self is rather important to define the self, yet an alternative interpretation is required.

In sum, contemporary philosophy ascertains the concept of self in twofold; the narrative self and the minimal self, or a sense of self stripped from our memories and thoughts about the future. Although these ideas assume that the self is a mental phenomenon, the self is also thought of as a physical entity. Let us now turn to the physiological definition of the self, proposed by cognitive neuroscientists.

### **The cognitive neuroscientist's perspective**

While the philosophical approach operates by isolating the self in various

perspectives, cognitive neuroscientists have a rather functional approach. Traditionally, the goal of cognitive neuroscientists is to "map the brain", that is, to associate mental function with bodily structure. Ideally, associating function to structure of the body is an approach used by most anatomists and physicians. While anatomists focus on the structure of the human body, physiologists examine the physiological mechanisms. Likewise, using functional magnetic resonance imaging (fMRI), research in cognitive neuroscience attempts to map psychological functioning to brain physiology and anatomical structure. Research in the cognitive neuroscience literature provides evidence of self-referential processing. For example, a proposed neural correlate corresponding to 'self-reflection', which is to unaffectedly reflect on one's current sense of self, was examined in an article by Johnson et al. (2002). Johnson found that when subjects responded to a variety of statements requiring knowledge of and reflection on their own abilities, traits and attitudes (e.g. 'I forget important things', 'I'm a good friend', 'I have a quick temper') during fMRI scanning, BOLD signals of the medial prefrontal and posterior cingulate cortex increased.

Functional evidence of the self is further supported by studies that examine mentalization, the ability to understand the mental or emotional state of oneself and others. It has been shown that patients with alexithymia are unable to understand one's mental state or the mental state of other people. Interestingly, patients that undergo alexithymia have smaller posterior cingulate and medial prefrontal cortices

(Mantani, Okamoto, Shirao, & Yamawaki, 2005; Moriguchi et al., 2006); the same regions as those involving self-reflection. Likewise, the so-called default mode network (DMN), a cortical network involving the posterior cingulate and medial prefrontal cortex, was serendipitously coined by a team of neurologists after numerous observations of detecting high activity while not engaged in cognitive tasks (Raichle et al., 2001). He labeled these coupled deactivated brain areas as the default mode network since these deactivations occurred only while subjects were asked to rest in the fMRI scanner with their eyes closed during baseline recordings. At that time researchers did not know the true function of the DMN, yet more recently, others suggested that the DMN was responsible for self-referential processing (Gusnard, Akbudak, Shulman, & Raichle, 2001; Gusnard & Raichle, 2001). This inference is based on research showing that while the subjects have their eyes closed, they reflect on earlier self-relevant situations and sometimes imagine future events. Further, the DMN involves several regions with various psychological functions. These include: posterior cingulate gyrus for mental imagery, precuneus accountable for multimodal integration, medial temporal lobe for autobiographical (episodic) memory, and part of the medial prefrontal cortex for theory of mind (Buckner, Andrews-Hanna, & Schacter, 2008). Taken together, the function of these regions may attribute to the narrative self, i.e. the sense of self that reflects past experiences and future decisions. This would require certain cognitive

processes such as episodic memory, theory of mind, and visual mental imagery. According to Buckner, the DMN involves these functions. The subcomponents of the DMN (the posterior, temporal and frontal lobes) are all associative areas, that is to say, areas that integrate information from the primary cortical areas (primary visual cortex, motor cortex, etc.). These findings imply that if the DMN is truly accountable for self-referential processing, then perhaps the self can indeed be examined as a physical neural network.

## Conclusion

The purpose of this paper was to attempt to establish a clear definition of the self by comparing contemporary descriptions of the self. By employing perspectives from philosophy, psychology and cognitive neuroscience, I was able to deduce that the self can be thought of as a mental subjective experience, perhaps as a byproduct of the DMN. While the definitions proposed by psychologists and philosophers focus on the self as a mental entity, cognitive neuroscientists assume that the self is a physical cortical network. Rather than dwelling on fundamentalism, I was able to emphasize that the self can be operationally defined through the works of Gallagher's modal of the self as well as measured functionally through fMRI recordings. To conclude, I will end with an analogy: the minimal self is rather black and white; all humans can very easily distinguish between selves and 'non-selves'. However, the reflective self and hence the narrative self are rather colorful; each color representing a specific emotion, thought, or experience.

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## Современное междисциплинарное определение «Я»

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## Резюме

В данной статье рассматриваются современные определения «Я» в философской литературе и в источниках когнитивной нейронауки. В этой статье предпринята попытка сформулировать операциональное определение «Я» путем объединения предложенной Галлахером модели нарративного и минимального «Я» и данных психологического и когнитивного разделов нейронауки. Галлахер характеризует нарративное «Я» как размышляющее о прошлом опыте и будущих начинаниях. С помощью нарративного «Я» формируются наши ожидания, убеждения, мысли, чувства и действия, при этом данные убеждения, мысли, чувства и действия оказывают на нас влияние при принятии решений. На основании данного определения Галлахер описывает нарративное «Я» как ансамбль «Я»,

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как вечно меняющуюся сущность, которая зависит от настроения, состояния и мотивации. С другой стороны, минимальное «Я» — просто «Я» в актуальном объективном состоянии, независимое от воспоминаний человека или будущих решений. Галлахер отмечает, что минимальное «Я» представлено чувством обладания (или самоданности) и чувством субъектности. Чувство обладания является признанием собственного ощущения «Я», которое можно интерпретировать как сущность, отдельную от объектов, которые не есть «Я». При этом чувство субъектности — это понимание того, что человек является источником действия. Также приводится операциональное определение «Я» в когнитивной нейронауке. Используя данные философские определения, предлагается проследить связь между этими двумя представлениями о «Я», сравнивая нарративное «Я» Галлахера с сетью пассивного режима работы мозга.

**Ключевые слова:** нарративное «Я», минимальное «Я», сеть пассивного режима работы мозга.