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Review

The pre-reflective experience of "I" as a continuously existing being: The role of temporal functional binding

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ABSTRACT

The present moment is of infinitesimally brief duration. In the brain, however, there are perceptual processes that bind together events occurring at different times, on a time scale of milliseconds, into a coherent and integrated temporal representation. These processes include temporal integration, as in perception of biological motion, synchronisation, and change detection. These processes are also responsible for temporal integration and coherence in inner mental life, such as in mental imagery. I argue that this gives rise to the pre-reflective experience of the self as a continuously existing being. Temporal integration is also a feature of the experience of action–outcome relations, and I argue that this produces a pre-reflective experience of the self, not just as continuously existing, but also as the doer of both physical and mental actions. This is the foundation on which the idea of the self as continuously existing on longer time scales – the narrative self – is built.

Contents

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1. Introduction

Most if not all humans have the experience of themselves as continuing to exist from moment to moment. There are two noteworthy aspects to that experience. One is of something that exists, but not just something but "I": it is "I" that exists, whatever "I" might be. The other is that the existence of "I" is not experienced as lacking extension in time. "I" is experienced as continuing to exist over time. This is not the product of deliberation: it appears to be fundamental and pre-reflective. Before going any further, it is important to say that I do not claim that there really is an "I" that exists continuously over time. Nor do I claim that it is not possible to doubt that there is such a thing: it is entirely possible that the experience of a continuously existing "I" is a kind of illusion. Nor do I claim that processes on time scales longer than those discussed here have no part to play in creating the impression of an "I" that exists continuously. I claim only that a continuously existing "I" is a pre-reflective experience common to all, or almost all, humans (I do not rule out the possibility that it may not occur in some cases, such as extreme mental retardation, extreme senile dementia, and some forms of mental illness).

It is possible to imagine that things might be otherwise, that conscious experiences go on in a flux, with nothing to bind them together. This position was famously advocated by Hume (1739/1978), who attempted to find his self through introspection and claimed to have found nothing more than a bundle of experiences. In modern philosophy the most reduced position is that of the minimal self (Gallagher, 2000), a self that is nothing more than the subject of experience now, that has no temporal extension and no substance beyond that of conscious experience itself, the "bare locus of consciousness" (Strawson, 1999, p. 492). In principle, "now" is an infinitesimally brief period of time. For all we know, we could have come into existence less than a millisecond ago, complete with all that is in phenomenal consciousness now, and all the processes going on in the brain, created in mid-stream, so to speak. We are probably all very certain that this did not happen, and that we have existed longer than that. Some of that certainty may come from the confidence we have that memories of things that happened seconds, minutes, or years ago represent things that really did happen, and that we really did them or experienced them at the time. In this paper, however, I shall argue that the ultimate foundation for our sense of our continued existence as a being is provided by processes that bind or integrate neural events occurring at close but different times, on very short time scales, and that any confidence in our existence that may come from information on longer time scales is dependent on the very short time-scale processes. Just to locate what I am aiming to talk about as clearly as possible, I am trying to explain the sense of being an "I" at the most fundamental level: that is, it is pre-linguistic, pre-reflective, and universal in human experience.

The term "self" is used with many meanings and connotations. It can be taken as referring to one's own body, especially to the sense or belief that one's body is one's own, or is part of one's identity as a human being (Boyer, Robbins, & Jack, 2005). It can be taken to refer to one's beliefs about one's enduring inner characteristics such as values, personality traits, and abilities. It can be taken to refer to one's sense of one's own past, the narrative construction of one's life in whole or part (Damasio, 1999; Dennett, 1991; Gallagher, 2000; Gazzaniga, 1998; Prebble, Addis, & Tippett, 2013). It can be taken to refer to oneself in the future, for example in relation to self-improvement programmes (Taylor & Gollwitzer, 1995). It can be taken to refer to meta-representation, where one is more or less consciously represented as an object of one's own thoughts (Blanke & Metzinger, 2009; Metzinger, 2003; Proust, 2003; Sedikides & Skowronski, 1997; Skowronsky, 2012). It can even be extended to things closely subjectively associated with the person, such as possessions (Kim & Johnson, 2012). Other meanings of the term can also be identified (Gallagher, 2000; Knoblich, Elsner, Aschersleben, & Metzinger, 2003; Legrand & Ruby, 2009). In an attempt to circumvent this profligate ambiguity, I shall use the term "I" (in quotation marks) with specific reference to the postulated pre-linguistic, pre-reflective sense of our own continued existence and, for the purposes of this paper, I do not use it to refer to any of the other meanings of the term "self" listed in this paragraph. Of course, I do not mean to imply that any of those other meanings is wrong or illegitimate; I am saying only that they are not what I seek to explain in this paper.

2. The hypothesis

The brain faces a fundamental problem with time. In reality, as soon as a present moment becomes a past moment, that moment, and all that was the case at that moment, is permanently inaccessible. If the brain simply registered information pertaining to one moment in time at a time, as time unfolded, this would be equivalent to having a series of static images with no history. All we would know would be the current static image. This poses various problems. One problem is that it is important to detect change and motion. For example, if an object is moving on a collision course with one's body, the motion of the object needs to be detected so that suitable action can be taken. This requires some form of integration of information across time. Another problem is that different processes, both within and between sensory modalities, have different processing rates and durations, so that even constructing a static image of a moment in time would require synchronisation of the outputs of the different processes involved. A third problem is that mental activity in general is transient, but attentive processing requires the maintenance of a body of information for the duration of the process operating on it. These are all important functions that have implications for the brain's relationship with time. Thus, while the present moment itself might not have temporal extension, perceptions as constructed in the brain represent temporal extension, connecting events in the recent past and representing them as unfolding smoothly, not just constructing sequences of unconnected static images. Synchronisation and information maintenance are important aspects of this, not just for perception but for mental activity in general.