



Original article

Brain imaging and the deconstruction of mind[☆]

Imagerie cérébrale et déconstruction de l'esprit

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Abstract

Objectives. – Brain imaging techniques today enable the study of functional connectivity between different brain regions, thereby providing insight into an individual's unique psychic world. The objective of this paper is to confront the classic notion of mind with the model of psychic processes developed and facilitated by brain imaging techniques.

Methods. – Techniques enabling the study of functional connectivity and connectivity abnormalities in mental disorders, and the potential usefulness of imaging techniques in recovery processes are reviewed. The questions of the contributions of brain imaging to understanding self and the elaboration of thoughts are also addressed.

Results. – Brain imaging techniques enable a deconstruction of psychic processes, and a reconceptualization of these processes in terms of connectomics. We also show how most recovery processes in psychiatric illnesses primarily consist in improvements in dysfunctional connections.

Discussion. – The study of brain functional connectivity leads to the construct of a vast, new imaginary sector, which could be called the “mind imagery sector”.

Conclusion. – Mind, freed from any metaphysical reference, is considered to be a product of brain activity. However, this should not imply that brain imaging can apprehend all the mind's complexity.

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Keywords: Brain; Functional connectivity; Self; Psychotherapy; Default mode network; Imaginary

Résumé

Objectifs. – Les techniques d'imagerie cérébrale permettent aujourd'hui l'observation de la connectivité fonctionnelle entre différentes régions du cerveau. Cela rend possible l'abord de l'intimité psychique de la

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personne. L'objectif de cet article est de confronter la notion classique d'esprit à l'approche des processus psychiques réalisée avec l'imagerie cérébrale.

Méthodes. – Sont passées en revue les techniques d'étude de la connectivité fonctionnelle cérébrale, les anomalies de connectivité dans les maladies psychiatriques, et l'utilité potentielle de ces techniques dans les processus de guérison. Est aussi abordée la question de l'apport de l'imagerie dans la compréhension de ce que sont le soi et l'élaboration des pensées.

Résultats. – L'imagerie cérébrale permet de déconstruire les processus psychiques, ouvrant sur la possibilité de les reconceptualiser sur des bases connectomiques. Et il est aujourd'hui évident que l'essentiel du soin en psychiatrie consiste à rendre fonctionnels des réseaux qui fonctionnent de façon pathologique au cours des maladies.

Discussion. – L'étude de la connectivité fonctionnelle cérébrale conduit à la construction d'un nouvel et immense espace imaginaire, que l'on peut qualifier d'imagerie de l'esprit.

Conclusion. – Libre de toute référence métaphysique, l'esprit ne peut être conçu que comme un produit de l'activité du cerveau. Ce qui ne signifie pas pour autant que les techniques actuelles d'imagerie cérébrale permettent de l'aborder dans toute sa complexité.

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Mots clés : Cerveau ; Connectivité fonctionnelle ; Soi ; Psychothérapie ; Réseau par défaut ; Imaginaire

The present era would have everything put into pictures, including the very thing that most escapes representation: the mind. The idea that the mind might be visually represented doubtless harks back to time immemorial. But a Copernican-like revolution is thought to have occurred at the end of the 19th century, when Alfred Lehmann proposed that chemical energy in the brain converts into three main forms: heat, electricity, and “P-Energy” [1], or “psychic energy”. Freud broached the issue in his own way in his *Entwurf einer Psychologie* [2], before moving on to other topics. This tale’s “Copernicus” was Hans Berner. Berner devoted his life, in a dogged, obsessional and almost mystical manner, to demonstrating the materiality of P-Energy [3]. 1924 saw the first recording of minute galvanometric oscillations on the skull of Zedel, a student who had undergone trepanation – they were tiny, but for the first time demonstrated that psychic energy could manifest itself materially in the form of oscillations. In its wake arrived the electroencephalogram, a machine to capture the mind, progressively perfected throughout the 20th century, and making it possible to record α , β , γ , δ , and τ waves, as if they were just so many pulsations of the soul.

The opponents to materialistic reductionism were quick to counter-attack: the mind, they retorted, cannot be reduced to a wavelength, and the notion that the electroencephalogram could provide images of the mind was dismissed as futile and misleading. Yet, a breach had been made, a breach affording access to the brain, that sacred temple of the mind. With the progress of technology, the huge field of brain imaging developed, in which, while the soul or the mind in itself is not specifically addressed, – the neighboring questions of thought, pleasure, suffering, anxiety, delusion, morals, empathy and dreams are indeed. As well as the Self. Up until then, medicine had been classically divided into two sectors: on the one hand a clinic of the soma, where the clinician puts into words what observation, palpation and listening reveal concerning the organic nature of the disorder, and on the other, a clinic of the mind, where something immaterial is played out between the subject, his life history, his discourse and his relationship with others. To these two classic sectors, the breach opened by Berner added a third, the imaging of the mind. Futile as it might have appeared at the start, today’s psychiatry is invaded by an exponential production of images. This third sector is underpinned by machines, techniques, and tools, once a mere

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