

GEORG NORTHOFF

NEUROPSYCHOANALYSIS

A Contemporary Introduction



Routledge Introductions to Contemporary Psychoanalysis
Series Editor: Aner Govrin



Neuropsychanalysis

Georg Northoff presents the first introduction to neuropsychanalysis and the search for a brain-based understanding and explanation of our psyche and its psychodynamic features.

This book covers the key features of psychodynamics, including the concepts of self, narcissism, defense mechanisms, unconsciousness/consciousness, attachment and trauma, energy/cathexis, and depression/schizophrenia. After reviewing past and current state-of-the-art models and their limitations, Northoff uniquely links these psychodynamic features to temporal and spatial features in the brain (and body). The key element in connecting brain and mind is dynamic, the pattern of change over time: from brain dynamic to psychodynamic – dynamic is thus shared by brain and psyche as their “common currency”. This spatiotemporal approach offers novel and sometimes surprising insights into the elusive connection of brain and mind. Ultimately, this carries important clinico-therapeutic implications for psychodynamic psychotherapy in a spatiotemporal sense, such as through spatiotemporal psychotherapy.

This accessible volume will be of great interest to neuroscientists, neuropsychanalysts, psychologists, psychoanalysts, and anyone interested in the brain–mind connection. Additional material for the present book including figures and tables as well as short talks about each chapter can be found on this website (www.georgnorthoff.com) including the author’s YouTube channel.

Georg Northoff is a philosopher, psychiatrist, and neuroscientist at the University of Ottawa, Canada, holding a Canada Research Chair for Mind, Brain Imaging and Neuroethics. His research focuses on the brain–mind connection and its subjectivity; he has published numerous books and papers on his unique spatiotemporal approach. His website is www.georgnorthoff.com.

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Introduction

Every attempt to discover a localization of mental processes . . . has miscarried completely. The same fate would await any theory that attempted to recognize the anatomical position of the system (consciousness) – as being in the cortex, and to localize the unconscious processes in the subcortical parts of the brain. There is a hiatus which at present cannot be filled, nor is it one of the tasks of psychology to fill it. Our psychical topography has for the present nothing to do with anatomy.

(Freud 1915)

Overview and main goal of the book

Mismatch between psyche and brain – different models in psychoanalysis and neuroscience

How can we link psychoanalysis to neuroscience? Freud himself tried to connect psychoanalysis and neuroscience in his early writing “Project of a Scientific Psychology” (1895). However, in the following, he gave up on such a project, focusing mainly on the development of psychoanalysis. These efforts flare up again our time, including various clusters of recent neuroscientific research. One cluster is the “embodied brain hypothesis” that conceives cognitive and affective functions of the brain as closely linked to the body and its interoceptive functions. This has led to concepts like “embodied remembering”, “embodied unconscious”, “embodied memories”, “embodied feelings”, and “embodied testimony” (Leuzinger-Bohleber 2018; Edelman 1987, 1989, 1992; Mucci 2019; Northoff 2011, 2012a).

Yet another cluster of neuroscientific research is the dynamic neuropsychology by AR Lurija that, through Solms' clinical-anatomical localization approach to psychodynamic features, provides one link of brain and psyche. Moreover, in addition to cognitive neuroscience, the development of affective neuroscience by especially Jaak Panksepp (1998) represents another cluster where primary and secondary emotions are linked to primary and secondary processes (Panksepp and Biven 2012; Solms 2015). Finally, yet another more recent cluster is developed by Mark Solms when he aims to link the free energy and predictive coding approach by Karl Friston to psychoanalysis: he considers the biologically and physically defined concepts of free energy and predictive coding to reflect what Freud referred to as mental or psychical energy (Solms 2020, 2021; Solms and Friston 2018). That, according to Solms, provides the key connection of brain and psyche as core feature of a "new project for a scientific psychology" (Solms 2020, 2021).

Despite all progress, neuroscientific approaches adhere to a scientific psychology that, as traditionally conceived, is based on specific functions and the third-person perspective. Just as the psyche is in psychology, the brain is conceived in terms of specific functions showing extrinsic contents, affective, cognitive, or social: these are localized in particular regions of the brain, remain the same over time, and are investigated by probing the brain's task-related activity. As in the case of the psyche in psychology, this amounts largely to a non-energetic, mostly static, content-based, and third-person-based view of the brain.

Psychoanalysis, in both its original inception and current manifestations, contends such a view of the psyche as presupposed in psychology. Instead, the psyche is conceived as highly energetic (like cathexis) rather than non-energetic; it is continuously changing and thus dynamic rather than static, exhibits a structure or organization that shapes its contents, and aims for a first- or second- rather than third-person-based view of the psyche (e.g., Schilbach 2010; Northoff et al. 2007; Przyrembel et al. 2012; Longo and Tsakiris 2013). This leaves a gap, a "gap of contingency", when compared to the current view of the brain in neuroscience: the energetic, dynamic, structural/organizational, and first-/second-person features of the psyche in psychoanalysis are related to a brain that is non-energetic, static, content based, and third-person based.

Such a mismatch between the models of psyche (in psychoanalysis) and brain (in affective, cognitive, and social neuroscience) renders it impossible to take into view their intimate connection, that is, how neural activity transforms into psychic activity. Our view of brain-psyche is consequently blocked by a gap, with their connection remaining contingent (rather than necessary a posteriori; Northoff 2018) – I will therefore speak later of a “gap of contingency”.

“Common currency” of brain and psyche – topography and dynamic

How can we close the “gap of contingency” between brain and psyche? One way is to take the brain into view in terms that are analogous to the model of the psyche in psychoanalysis. Specifically, one may want to conceive of the brain in terms of its energy, dynamic, structure/topography, and first-/second-person perspective. Brain and psyche can then be conceived of in analogous terms with the ultimate hope that these features are shared by brain and psyche as their “common currency” (Northoff et al. 2020a).

What can such “common currency” consist in? I propose that it consists in the most basic feature of both brain and psyche, namely their own inner time and space. Space is manifest in topography, while time is constituted by change, that is, dynamic. I thus propose that topography and dynamic are shared by both brain and psyche, providing their intimate link, the “common currency”. What exactly is meant by that will be developed and sketched in this introduction and applied to various psychodynamic features in the subsequent chapters.

The goal of this book is to provide an overview of neuropsychanalysis by gaining insight into this more intimate spatiotemporal connection of brain and psyche in a truly dynamic, energetic, and structural way. We will see how such a view of the brain can provide a direct link to various psychodynamic features as discussed in current psychoanalysis like self and narcissism (Chapter 1), attachment and trauma (Chapter 2), defense mechanisms (Chapter 3), cathexis (Chapter 4), unconscious and conscious (Chapter 5), dreams (Chapter 6), schizophrenia and depression (Chapter 7), and even psychodynamic or, better, spatiotemporal psychotherapy (Conclusion).

Given that this book is short, its focus is more on developing the brain–psyche link rather than discussing all the various (neuro)psychoanalytic theories and approaches in full detail. I conclude that this more intimate brain–psyche connection holds the promise of completing Freud’s own unfinished attempt to link psychology and neuroscience in his “project for a scientific psychology” (1895), including its more recent variant, Mark Solms’ “(new) project for a scientific psychology” (Solms 2020, 2021). I therefore speak of a “project for a spatiotemporal neuroscience” (Northoff and Scalabrini 2021) (Conclusion).

Psychoanalysis and neuroscience – contrasting views of psyche and brain

Psyche in psychoanalysis – dynamic, topographic, and spatio-temporal

One of Freud’s key observations was that the psyche is dynamic; that is, it changes over time, with the changes following a certain pattern that establishes a particular structure or organization. The emphasis on the dynamics of the psyche is well reflected in his notion of mental or psychic energy, that is, cathexis, that fuels drives, libido, instinct, and the dynamic unconscious where cathexis remains unconstrained. This mental energy is key in structuring and organizing the psyche in a dynamic way. That is reflected in his first topographical model of the unconscious–conscious as well as in his second topographical model of the three-fold relation of *Id*, *Ego*, and *Super-ego*.

Freud aimed to decipher a deeper and more fundamental layer of the psyche beneath its functions and contents when focusing on its dynamic and topography. How, though, can we describe dynamic and topography of the psyche independently of and prior to their functions and contents? Freud himself emphasizes the spatial and temporal features of the psyche – we may require a spatiotemporal complementing the affective and/or cognitive approach to the psyche. This is well reflected in the following quote by Freud himself.

Accordingly, we will picture the mental apparatus as a compound instrument, to the components of which we will give the

name of “agencies”, or (for the sake of greater clarity) “systems”. It is to be anticipated, in the next place, that these systems may perhaps stand in a regular spatial relation to one another, in the same kind of way in which the various systems of lenses in a telescope are arranged behind one another. Strictly speaking, there is no need for the hypothesis that the psychical systems are actually arranged in a *spatial* order. It would be sufficient if a fixed order were established by the fact that in a given psychical process the excitation passes through the systems in a particular *temporal* sequence. In other processes the sequence may perhaps be a different one; that is a possibility that we shall leave open. For the sake of brevity we will in future speak of the components of the apparatus as “ ψ -systems”

(Freud 1900, 535; emphasis added)

Psyche in psychology – static, modular, and non-spatiotemporal

The conception of the psyche in psychoanalysis by dynamic, topography, and spatiotemporal features stands in contrast to the view of the static view of the psyche. The psyche is often conceived as a collection of functions in terms of modules that are merely added together, standing side by side in parallel. For instance, different memory systems (like working, semantic, and episodic memory), as well as distinct emotions or form of attention, are distinguished from each other operating more or less independently or in a modular way. Accordingly, there is no assumption of an overall psychic structure, that is, topography encompassing all functions in an organized whole.

Moreover, the various psychological functions are considered stable and non-changing, thus being static – the dynamic beneath the functions is thus often neglected. Together, this amounts to a view of the psyche in psychology in terms of functions and their contents, while their underlying spatial and temporal features are neglected. This stands in contrast to the view of the psyche in psychoanalysis, where spatial and temporal features are assumed to shape and constitute the psyche (see previously).

Finally, there is also a methodological difference between psychoanalysis and psychology regarding first-/second- vs. third-person

perspective. Psychoanalysis requires first-/second-person reports with subjective experience for understanding the dynamic manifestations of psychic energy as well as the structure of conscious–unconscious and *Id–Ego–Super-Ego*, that is, their topography. That stands in contrast to psychology. Here, the focus is on objective observation in third-person perspective so as to eclipse and exclude any traces of subjective first/second perspective. Even stronger, first-/second-person experience is often criticized as non-scientific in conventional psychology that focuses strictly on third-person perspective to acquire data. Hence, the dynamic vs static approaches to the psyche stand in opposition and are exclusive on methodological grounds. This makes a more comprehensive and holistic approach more urgent.

View of the brain in cognitive, affective, and social neuroscience – static, regional-modular, and non-spatiotemporal

Neuroscience and its different branches, like cognitive, affective, social, and cultural (just to name a few), are developed largely as extensions of the respective branches in psychology. This means that the static, modular, non-spatial, non-temporal, and third-person–based view of the psyche is more or less transferred to the brain itself.

Particular cognitive or affective functions are associated with specific brain regions whose neural activity, as related to these functions, is conceived of as non-changing, that is, static and modular, that is, localized in specific brain regions (like the localization of primary and secondary emotions in distinct subcortical and cortical regions; Panksepp 1998). The brain itself and its neural activity are consequently conceived of as static, modular, non-spatiotemporal, and third-person based. This view of the brain, although necessary for the discovery of brain-related functions and contents, predominates in current cognitive and affective neuroscience (and related branches like social and cultural neuroscience) and lacks a more holistic and comprehensive approach.

The primacy of functions and contents goes along with a focus on task-related activity that measures the impact of the former on the brain's neural activity. Analogously to the functions themselves, task-related activity is then also considered in a static and regional-modular way

independently of potentially underlying spatial and temporal features. Taken together, cognitive and affective neuroscience (and their various siblings) consider the brain and its task-related activity in more or less the same terms as the psyche is viewed in psychology.

Given such an analogy in their characterization, the brain and its task-related activity are supposed to account for the psyche, thus bridging the gap between neuroscience and psychology. In contrast, such a view of the brain does not bridge the gap to the view of the psyche in psychoanalysis, as that is dynamic, topographic, and spatiotemporal rather than static, modular, and non-spatiotemporal.

“Common currency” of brain and psyche – topography and dynamic

“Common currency” – temporal dynamic and spatial topography are shared by brain and psyche

How can cognitive, social, and affective neuroscience account for the psychodynamic view of the psyche? The various clusters of their connection pointed out in this introduction cannot but suffer from a fundamental discrepancy between brain and psyche. They all aim to connect a static, regional-modular, and non-spatiotemporal brain, featuring its extrinsic task-related activity, with a dynamic, topographic, and spatiotemporal psyche characterized by its intrinsic spontaneity. The only way to remedy this discrepancy is to view the brain in a way that is analogous to the psyche in psychoanalysis. The brain and its neural activity may thus need to be conceived as dynamic, topographic, and spatiotemporal – this is the aim of what recently has been introduced as “spatiotemporal neuroscience” (Northoff et al. 2020a, 2020b).

One key feature of the brain is its spontaneous activity that refers to the absence of specific tasks or stimuli as can be measured during the resting state (Logothetis et al. 2009; Northoff 2012b, 2014a, 2014b, 2018; Raichle 2009, 2010). The spontaneous activity can be characterized topographically by various interacting networks like default-mode network, salience network, central executive network, and so on, whose relationships seem to be modulated by the brain’s global activity, that is, global signal topography (Scalabrini et al. 2020;

Zhang et al. 2020; Tanabe et al. 2020), while on the temporal side, the brain's spontaneous activity is characterized by fluctuations or oscillations in various frequency ranges (see the following for details) that, together, provide a certain temporal dynamic structure (Buzsaki 2006; Northoff 2018; He 2014; Scalabrini et al. 2017, 2019).

The spontaneous activity itself has recently been associated with various internally oriented cognitive functions like mind wandering (Christoff et al. 2016; Smallwood and Schooler 2015; Northoff 2018), mental time travel or episodic simulation (Schacter et al. 2012; Northoff 2017), autobiographical memory, and self-referential processing (Northoff et al. 2006; Northoff 2016). Hence, the spatial topography of the spontaneous activity may itself be related to different forms of cognition (Smallwood et al. 2021; Yeshurun et al. 2021). This leaves open how the spontaneous activity mediates such cognitive (and also affective and social) functions during both resting state and task-related activity, though. Addressing this question is key in providing an intimate connection of the brain and cognition/emotion, that is, of neural and psychological activity and hence of brain and psyche.

We postulate that, in order to provide such an intimate connection, brain and psyche must share some features, a “common currency” (Northoff et al. 2020a, 2020b). Freud's topography and dynamic of the psyche entail a spatial and temporal view of the psyche: the temporal and spatial organization and structure of the psyche shape its contents and functions. Relying on Freud and our spatiotemporal characterization of the brain's spontaneous activity, we now propose that spatial topography and temporal dynamic are shared by both neural and psychic activity. What Freud described as mental topography and dynamic of the psyche also characterizes, in more or less analogous ways, the brain's neural activity, including both spontaneous and task-related activity. Spatial topography and temporal dynamic are thus shared as “common currency” of brain and psyche (Northoff et al. 2020a, 2020b).

View of the brain in spatiotemporal neuroscience – dynamic, topographic, and spatiotemporal

We are now ready to determine what we recently introduced as “spatiotemporal neuroscience” (Northoff et al. 2020a, 2020b). As explicated previously, cognitive and affective (and social and cultural

neuroscience) largely view the brain as static, regional-modular, and non-spatiotemporal. This contrasts with spatiotemporal neuroscience, which conceives the brain's neural activity (including both spontaneous and task-related activity) largely in dynamic, topographic, and spatiotemporal terms.

Rather than the neural activity of affective, cognitive, and so on functions and contents themselves, the focus in spatiotemporal neuroscience is on the spatial topography and temporal dynamic of their neural activity during both internally and externally oriented cognition. Spatiotemporal neuroscience thus conceives both the brain's neural activity and the psyche's mental activity primarily in spatial-topographic and temporal-dynamic terms: it focuses on the brain's spatial and temporal features that constitute its dynamic and topography and how they, in turn, shape cognitive, affective, and social brain function including their respective contents. This makes it clear that spatiotemporal neuroscience neither stands contradictory to nor is exclusive to affective, cognitive, and social neuroscience. Instead, the former integrates and embeds the latter in a broader, more comprehensive spatial and temporal context, that is, topography and dynamic.

The same also applies to predictive coding and free energy. Spatiotemporal neuroscience provides the spatial-topographic and temporal-dynamic context within which predictive coding and free energy operate; they provide what has been called “deep temporal model” (Kiebel et al. 2008; Friston et al. 2017) or “temporal thickness” (Seth 2015). The same applies to the link of first and third person. Spatiotemporal neuroscience takes into consideration first-person experience of mental features and links them to third-person observation about the brain – this link is made possible through spatiotemporal features being shared by both first and third person as their “common currency”. This shall now be demonstrated by various examples of different psychodynamic features, as laid out in the subsequent chapters.

References

- Buzsaki G (2006) *Rhythms of the brain*. Oxford University Press, Oxford.
doi: 10.1093/acprof:oso/9780195301069.001.0001
- Christoff K, Irving ZC, Fox KC, Spreng RN, Andrews-Hanna JR (2016) Mind-wandering as spontaneous thought: A dynamic framework. *Nat Rev Neurosci*. 17(11):718–731. doi: 10.1038/nrn.2016.113

- Edelman GM (1987) *Neural Darwinism: The theory of neuronal group selection*. Basic Books, New York.
- Edelman GM (1989) *The remembered present: A biological theory of consciousness*. Basic Books, New York.
- Edelman GM (1992) *Bright air, brilliant fire: On the matter of the mind*. Basic Books, New York.
- Freud S (1895) *Project for a scientific psychology*. Hogarth Press, London.
- Freud S (1900) *The interpretation of dreams* (SE, Vols. 4 & 5). Hogarth Press, London.
- Freud S (1915) *The unconscious* (SE, Vol. 14, pp. 166–204). Hogarth Press, London.
- Friston KJ, Parr T, de Vries B (2017) The graphical brain: Belief propagation and active inference. *Netw Neurosci.* 1(4):381–414. doi: 10.1162/NETN_a_00018
- He BJ (2014) Scale-free brain activity: Past, present, and future. *Trends Cogn Sci.* 18(9):480–487. doi: 10.1016/j.tics.2014.04.003
- Kiebel SJ, Daunizeau J, Friston KJ (2008) A hierarchy of time-scales and the brain. *PLoS Comput Biol.* 4(11):e1000209. doi: 10.1371/journal.pcbi.1000209
- Leuzinger-Bohleber M (2018) *Finding the body in the mind: Embodied memories, trauma, and depression*. Routledge, Abingdon, UK.
- Logothetis NK, Murayama Y, Augath M, Steffen T, Werner J, Oeltermann A (2009) How not to study spontaneous activity. *Neuroimage.* 45(4):1080–1089. doi: j.neuroimage.2009.01.010
- Longo MR, Tsakiris M (2013) Merging second-person and first-person neuroscience. *The Behavioral and Brain Sciences.* 36(4):429. doi: 10.1017/S0140525X12001975
- Mucci C (2019) Traumatization through human agency: “Embodied witnessing” is essential in the treatment of survivors. *Am. J. Psychoanal.* 79:540–554. doi: 10.1057/s11231-019-09225-y
- Northoff G (2011) *Neuropsychoanalysis in practice: Brain, self and objects*. Oxford University Press, Oxford.
- Northoff G (2012a) Psychoanalysis and the brain: Why did Freud abandon neuroscience? *Front. Psychol.* 3:71. doi: 10.3389/fpsyg.2012.00071
- Northoff G (2012b) Immanuel Kant’s mind and the brain’s resting state. *Trends Cogn Sci.* 16(7):356–359. doi: 10.1016/j.tics.2012.06.001
- Northoff G (2014a) *Unlocking the brain: Volume 1 coding*. Oxford University Press, Oxford. doi: 10.1093/acprof:oso/9780199826988.001.0001
- Northoff G (2014b) *Unlocking the brain: Volume 2 consciousness*. Oxford University Press, Oxford. doi: 10.1093/acprof:oso/9780199826995.001.0001
- Northoff G (2016) Is the self a higher-order or fundamental function of the brain? The “basis model of self-specificity” and its encoding by