

## Book review

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*A Neurodynamic Theory of Schizophrenia (and related disorders)*. By R. Miller. (Pp. 681, £77.502, ISBN 978-0-473-13653-6 hb.) Lulu.com: New Zealand. 2008.

Modern schizophrenia research covers a vast intellectual territory, from urbanicity to P50 waveforms, from smooth-pursuit eye movement to D<sub>2</sub> receptors, from factor analysis to white-matter tracts, and so-on. Surely no one person can have the energy to acquire mastery in all these sub-fields, let alone attempt a synthesis of the present knowledge in all its bewildering complexity. But Miller seems to be undaunted by the sheer size of this task and has produced a work which is readable, highly educational and original.

The main aim is to provide support for his neurodynamic theory of schizophrenia, which can be summarized as follows: (1) Schizophrenia (trait) and psychosis (state) are separable, *although researchers have often failed to make this distinction*. (2) Schizophrenia is based on a failure of rapid integration within the cortices. (3) The right hemisphere, which deals in wholes (Gestalts), has more dependency upon fast conduction within and between cortical modules than the left. (4) In schizophrenia there are consistent deficits in fast integration arising from slower conduction speeds, and this is manifest especially on the right-hand side. (5) Impaired rapid cortical integration predisposes to excess impulse traffic in midbrain dopamine neurons and psychotic episodes.

One by-product is that, given the sheer wealth of information, Miller's book functions as a reference manual and a source of information, rather than a mere vehicle to advance his theory. The central chapters – a series of exquisitely referenced reviews – follow a common format. The historical underpinnings of ideas (and methods) are traced to their roots, followed by their initial popularization and, all too often, their demise amid inconsistent results and controversy. Those ideas which do survive are given a more thorough treatment. Miller explores where the sensory, motor, cognitive, electrical and structural deficits of schizophrenia fit (or are at odds with) his central theory, of impaired fast cortical conduction. The by-product for the reader is a well-organized, comprehensive and authoritative description of endophenotypes across the schizophrenia spectrum and in first-degree relatives of patients.

A Neurodynamic Theory will be of interest to 'coal-face' psychiatrists of any persuasion wondering where modern schizophrenia research is at. Miller completely transcends the mind/brain, endogenous/environmental debates; and places his dialogue firmly within the realm of neural plasticity and cortical dynamics. A few gems stand out. The white-matter cables interconnecting the cortex (Miller believes there are too few of the large fast-conducting fibres in schizophrenia) are themselves subject to plasticity – intriguingly they become larger and more thickly myelinated in enriched environments. And, in contrast to popular belief, schizophrenia patients are not uniformly outperformed by healthy controls – the resulting excess of slow cortical conduction favours, for example, better subliminal perception in patients *versus* controls.

The attention to detail, the rigorous analysis of methods (both historical and current) will appeal to present-day schizophrenia researchers. Every working schizophrenia laboratory (wet or dry) should endeavour to secure a copy of this book. The text functions equally well as: an arbiter in laboratory debates; as a quick, emergency solution for knowledge gaps; for teaching purposes; and perhaps most of all – in presenting sensible research questions which can be tested experimentally. For example, the modern methods of white-matter tractography combined with electrophysiological recording might offer a way to directly measure conduction times in cortical fibres and put Miller's central hypothesis to the test. Another route may be the analysis of RNA expression and proteins in the white matter, an area attracting recent attention.

The book is not without its faults. Inevitably, any chapter on schizophrenia genetics will date very quickly. The fanfare over neuregulin, dysbindin, etc. is not covered here. The genetics chapter can be skipped through without impoverishing the central themes. In contrast, the chapter on dopamine should not be missed. Miller goes beyond typical discussions, asking key questions, for example, what drives the excess of dopamine in acute psychosis? And how does dopamine impact on the striatal circuitry to elicit psychosis? He interrogates the anatomical connectivity and the receptor subtypes, searching for a neurological account rather than being satisfied with 'reified' psychological concepts, which although important and necessary, tend towards the dogmatic.

Many will be put off by the size of this book (>600 pages). For those who do engage, the rewards are likely to be high. An excellent synopsis (chapter 2) serves as a concise summary and introduction to Miller's ideas. Interested (or sceptical readers) can dip

in and out of the central chapters for more complex material and discussion.

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