

Book Review

REVIEW OF *The Neuroscience of Handwriting: Applications for Forensic Document Examination*

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Caligiuri, Michael P. and Mohammed, Linton A., (2012). *The Neuroscience of Handwriting: Applications for Forensic Document Examination*, CRC Press, Boca Raton, Florida, 247 pages, \$139.95

Handwriting is deconstructed to the cellular level in this unprecedented work by neuroscientist Michael P. Caligiuri and forensic document examiner Linton Mohammed. *The Neuroscience of Handwriting: Applications for Forensic Document Examination* begins with a journey into the brain to discover the neuroanatomical bases of hand motor control. Next, the authors examine how lesion studies, neurosurgery outcomes, and functional neuroimaging research inform what is known about the bases of motor control and the handwriting process. Models for motor control and the processes underlying complex handwriting movements are presented, followed by a discussion of how neurologic disease, psychotropic medications, and aging affect handwriting.

In Section 2, the reader is introduced to kinematics, a quantitative approach to the dynamic analysis of handwriting and signatures using parameters such as stroke length, average stroke velocity, and pen pressure. The results of several kinematic studies conducted by the authors are presented here and in Section 3, which further explores the effects of substance abuse, aging, and neurologic diseases such as Parkinson's on handwriting.

The Neuroscience of Handwriting contains a wealth of information in its extensive review of existing research, its discussion of findings from recent kinematic studies, and its explanation of

how the brain mediates writing. Forensic document examiners wishing to learn more about the brain's role in executing handwriting will find their answers in this text, and can refer to the impressive 27-page bibliography for additional sources of information.

This volume is the first book in the field of Questioned Documents dedicated to providing an in-depth look at handwriting as a complex neuromuscular task. Readers may find the block diagrams of neurological circuits and the heavy use of neuroscience terminology in the first few chapters to be intimidating, if not inaccessible. However, neuroscience terms are explained throughout the text and summaries are provided at the end of each chapter for those who wish to skip ahead to brief synopses. Critics who believe that handwriting identification lacks a scientific foundation may find their arguments weakened by the studies presented in this book. There is no shortage of diagrams and tables, however, the presentation format of certain quantitative data may be difficult for the document examiner to translate into applied knowledge. If the authors choose to collaborate on a second edition, the inclusion of additional high-resolution images of writing would be beneficial, especially those illustrating the trends identified through the kinematic studies presented in the first edition.

*Ms. Caine contributed to this article in her personal capacity. The views expressed are her own and do not necessarily represent the views of the Treasury Inspector General for Tax Administration or the United States Government.