

Cambridge University Press

978-0-521-51699-0 - The Dopaminergic Mind in Human Evolution and History

Fred H. Previc

Frontmatter

[More information](#)

The Dopaminergic Mind in Human Evolution and History

What does it mean to be human? There are many theories of the evolution of human behavior which seek to explain how our brains evolved to support our unique abilities and personalities. Most of these have focused on the role of brain size or specific genetic adaptations of the brain. In contrast, Fred Previc presents a provocative theory that high levels of dopamine, the most widely studied neurotransmitter, account for all major aspects of modern human behavior. He further emphasizes the role of epigenetic rather than genetic factors in the rise of dopamine. Previc contrasts the great achievements of the dopaminergic mind with the harmful effects of rising dopamine levels in modern societies and concludes with a critical examination of whether the dopaminergic mind that has evolved in humans is still adaptive to the health of humans and to the planet in general.

Fred H. Previc is currently a science teacher at the Eleanor Kolitz Academy in San Antonio, Texas. For over twenty years, he was a researcher at the United States Air Force Research Laboratory where he researched laser bioeffects, spatial disorientation in flight, and various topics in sensory psychology, physiological psychology, and cognitive neuroscience. Dr. Previc has written numerous articles on the origins of brain lateralization, the neuropsychology of 3-D space, the origins of human intelligence, the neurochemical basis of performance in extreme environments, and the neuropsychology of religion.

Cambridge University Press

978-0-521-51699-0 - The Dopaminergic Mind in Human Evolution and History

Fred H. Previc

Frontmatter

[More information](#)

This book is dedicated to mati and oce (in memoriam)
and to Nancy, Andrew and Nicholas.

Cambridge University Press

978-0-521-51699-0 - The Dopaminergic Mind in Human Evolution and History

Fred H. Previc

Frontmatter

[More information](#)

The Dopaminergic Mind in Human Evolution and History

Fred H. Previc



CAMBRIDGE
UNIVERSITY PRESS

Cambridge University Press

978-0-521-51699-0 - The Dopaminergic Mind in Human Evolution and History

Fred H. Previc

Frontmatter

[More information](#)

CAMBRIDGE UNIVERSITY PRESS

Cambridge, New York, Melbourne, Madrid, Cape Town, Singapore,
São Paulo, Delhi

Cambridge University Press

The Edinburgh Building, Cambridge CB2 8RU, UK

Published in the United States of America by Cambridge University Press,
New York

www.cambridge.org

Information on this title: www.cambridge.org/9780521516990

© Fred H. Previc 2009

This publication is in copyright. Subject to statutory exception
and to the provisions of relevant collective licensing agreements,
no reproduction of any part may take place without
the written permission of Cambridge University Press.

First published 2009

Printed in the United Kingdom at the University Press, Cambridge

A catalogue record for this publication is available from the British Library

Library of Congress Cataloguing in Publication data

Previc, Fred H.

The dopaminergic mind in human evolution and history / Fred H. Previc.

p. cm.

Includes bibliographical references and index.

ISBN 978-0-521-51699-0 (hardback)

1. Dopaminergic mechanisms. 2. Brain—Evolution. 3. Human evolution.

4. Neuropsychology. I. Title.

[DNLM: 1. Receptors, Dopamine—physiology. 2. Behavior—physiology.

3. Brain Chemistry—genetics 4. Dopamine—physiology.

5. Evolution. 6. Humans—genetics.]

WL 102.8 P944d 2009]

QP364.7.p74 2009

612.8'2—dc22

2009004657

ISBN 978-0-521-51699-0 hardback

Cambridge University Press has no responsibility for the persistence or
accuracy of URLs for external or third-party internet websites referred to
in this publication, and does not guarantee that any content on such
websites is, or will remain, accurate or appropriate.

Cambridge University Press

978-0-521-51699-0 - The Dopaminergic Mind in Human Evolution and History

Fred H. Previc

Frontmatter

[More information](#)

Contents

<i>List of figures</i>	<i>page</i> vii
<i>List of tables</i>	viii
<i>Acknowledgments</i>	ix
1 What makes humans special?	1
1.1 Myths concerning the origins of human behavior	3
1.1.1 Was human intelligence genetically selected?	3
1.1.2 Did our larger brains make us more intelligent?	10
1.2 The evolution of human intelligence: an alternative view	13
1.2.1 Dopamine and advanced intelligence	13
1.2.2 The rise of dopamine during human evolution	17
2 Dopamine in the brain	19
2.1 The neurochemistry of dopamine	19
2.2 The neuroanatomy of dopamine	23
2.3 Dopamine and the left hemisphere	31
2.4 Dopamine and the autonomic nervous system	33
2.5 Summary	35
3 Dopamine and behavior	37
3.1 Dopamine and distant space and time	38
3.1.1 Dopamine and attention to spatially and temporally distant cues	41
3.1.2 Dopamine and goal-directedness	46
3.1.3 Dopamine and extrapersonal experiences	49
3.2 Dopamine and intelligence	53
3.2.1 Motor programming and sequencing	57
3.2.2 Working memory	59
3.2.3 Cognitive flexibility	59
3.2.4 Abstract representation	61
3.2.5 Temporal analysis/processing speed	62
3.2.6 Generativity/creativity	63
3.3 Dopamine and emotion	64
3.4 The dopaminergic personality	66
3.4.1 Ventromedial dopaminergic traits	68

Cambridge University Press

978-0-521-51699-0 - The Dopaminergic Mind in Human Evolution and History

Fred H. Previc

Frontmatter

[More information](#)

vi

Contents

3.4.2 Lateral-dopaminergic traits	69
3.4.3 Dopamine and the left-hemispheric (masculine) style	71
3.5 Summary	73
4 Dopamine and mental health	75
4.1 The “hyperdopaminergic” syndrome	75
4.2 Disorders involving primary dopamine dysfunction	79
4.2.1 Attention-deficit/hyperactivity disorder	79
4.2.2 Autism	81
4.2.3 Huntington’s disease	83
4.2.4 Mania (bipolar disorder)	84
4.2.5 Obsessive-compulsive disorder	86
4.2.6 Parkinson’s disease	88
4.2.7 Phenylketonuria	90
4.2.8 Schizophrenia	91
4.2.9 Tourette’s syndrome	95
4.3 Summary	97
5 Evolution of the dopaminergic mind	101
5.1 The importance of epigenetic inheritance	101
5.2 Evolution of the protodopaminergic mind	104
5.2.1 Environmental adaptations in the “cradle of humanity”	104
5.2.2 Thermoregulation and its consequences	108
5.3 The emergence of the dopaminergic mind in later evolution	114
5.3.1 The importance of shellfish consumption	117
5.3.2 The role of population pressures and cultural exchange	119
5.4 Summary	121
6 The dopaminergic mind in history	123
6.1 The transition to the dopaminergic society	123
6.2 The role of dopaminergic personalities in human history	130
6.2.1 Alexander the Great	134
6.2.2 Christopher Columbus	136
6.2.3 Isaac Newton	139
6.2.4 Napoleon Bonaparte	142
6.2.5 Albert Einstein	144
6.2.6 Dopaminergic personalities in history – reprise	147
6.3 The modern hyperdopaminergic society	149
6.4 Summary	153
7 Relinquishing the dopaminergic imperative	155
7.1 Reaching the limits of the dopaminergic mind	155
7.2 Tempering the dopaminergic mind	161
7.2.1 Altering dopamine with individual behavior	161
7.2.2 Knocking down the pillars of the hyperdopaminergic society	165
7.3 Toward a new consciousness	170
<i>References</i>	173
<i>Index</i>	208

Cambridge University Press

978-0-521-51699-0 - The Dopaminergic Mind in Human Evolution and History

Fred H. Previc

Frontmatter

[More information](#)

Figures

2.1 The chemical structure of dopamine and norepinephrine.	<i>page</i> 20
2.2 The dopamine neuron and synapse.	22
2.3 The cardinal directions and nomenclature used in brain anatomical localization.	24
2.4 Some of the major dopamine systems, shown in a mid-sagittal view.	26
3.1 The realms of interaction in 3-D space and their cortical representations.	39
3.2 Upward dopaminergic biases.	43
3.3 The dopaminergic exploration of distant space across mammals.	44
3.4 An axial (horizontal) section of a human brain showing reduced dopamine D ₂ receptor binding (increased dopamine activity) in the left and right caudate nuclei in a reversal shift memory task.	54
5.1 The hypothesized direction of modern human origins and migration.	116
6.1 Five famous dopaminergic minds in history: Alexander the Great, Christopher Columbus, Isaac Newton, Napoleon Bonaparte, and Albert Einstein.	133
6.2 The progression of the dopaminergic mind.	154
7.1 Restoring balance to the dopaminergic mind.	172

Cambridge University Press

978-0-521-51699-0 - The Dopaminergic Mind in Human Evolution and History

Fred H. Previc

Frontmatter

[More information](#)

Tables

3.1 Features of the two dopaminergic systems.	<i>page</i> 67
4.1 Features of the major hyperdopaminergic disorders.	98
4.2 Co-morbidity of the major hyperdopaminergic disorders.	99
6.1 Dopaminergic traits in famous men of history.	148

Cambridge University Press
978-0-521-51699-0 - The Dopaminergic Mind in Human Evolution and History
Fred H. Previc
Frontmatter
[More information](#)

Acknowledgments

I wish to thank the many scientists who shared their ideas or findings with me and especially those who reviewed either large sections of this book or the book in its entirety (Dr. Britt Bousman, Mr. Jeff Cooper, Dr. Michael Corballis, Dr. Jaak Panksepp, and Dr. Julie Sherman). I also wish to thank Andrew Peart for his support in making the publication of this work possible.