

The Entangled Brain

The Entangled Brain

How Perception, Cognition, and Emotion Are Woven Together

Luiz Pessoa

**The MIT Press
Cambridge, Massachusetts
London, England**

© 2022 Massachusetts Institute of Technology

This work is subject to a Creative Commons CC-BY-NC-ND license. Subject to such license, all rights are reserved.



The MIT Press would like to thank the anonymous peer reviewers who provided comments on drafts of this book. The generous work of academic experts is essential for establishing the authority and quality of our publications. We acknowledge with gratitude the contributions of these otherwise uncredited readers.

This book was set in Stone Serif and Stone Sans by Westchester Publishing Services.

Library of Congress Cataloging-in-Publication Data

Names: Pessoa, Luiz, author.

Title: The entangled brain : how perception, cognition, and emotion are woven together / Luiz Pessoa.

Description: Cambridge, Massachusetts : The MIT Press, [2022] | Includes bibliographical references and index.

Identifiers: LCCN 2021061878 (print) | LCCN 2021061879 (ebook) | ISBN 9780262544603 (paperback) | ISBN 9780262372107 (pdf) | ISBN 9780262372114 (epub)

Subjects: LCSH: Perception. | Emotions and cognition. | Brain. | Neuropsychology.

Classification: LCC BF311 .P3767 2022 (print) | LCC BF311 (ebook) | DDC 153—dc23/eng/20220411

LC record available at <https://lccn.loc.gov/2021061878>

LC ebook record available at <https://lccn.loc.gov/2021061879>

To Amelie and Meg

Contents

Preface ix

1	From One Area at a Time to Networked Systems	1
2	Learning a Bit of Anatomy	15
3	The Minimal Brain: Building Simple Defenses and Seeking Rewards	31
4	What Do Brain Areas Do?	47
5	Emotion and Motivation: The Subcortical Players	65
6	Emotion and Motivation: The Cortex Comes to the Party	93
7	Cognition and the Prefrontal Cortex	111
8	Complex Systems: The Science of Interacting Parts	129
9	500 Million Years of Evolution	145
10	The Big Network: Putting Things Together	167
11	Unlearning Fear	193
12	It's All about Complex, Entangled Networks	215

Glossary 231

Notes 235

References 247

Index 261

This is a section of [doi:10.7551/mitpress/14636.001.0001](https://doi.org/10.7551/mitpress/14636.001.0001)

The Entangled Brain

How Perception, Cognition, and Emotion Are Woven Together

By: Luiz Pessoa

Citation:

The Entangled Brain: How Perception, Cognition, and Emotion Are Woven Together

By: Luiz Pessoa

DOI: [10.7551/mitpress/14636.001.0001](https://doi.org/10.7551/mitpress/14636.001.0001)

ISBN (electronic): 9780262372107

Publisher: The MIT Press

Published: 2022

The open access edition of this book was made possible by generous funding and support from MIT Press Direct to Open



The MIT Press

© 2022 Massachusetts Institute of Technology

This work is subject to a Creative Commons CC-BY-NC-ND license. Subject to such license, all rights are reserved.



The MIT Press would like to thank the anonymous peer reviewers who provided comments on drafts of this book. The generous work of academic experts is essential for establishing the authority and quality of our publications. We acknowledge with gratitude the contributions of these otherwise uncredited readers.

This book was set in Stone Serif and Stone Sans by Westchester Publishing Services.

Library of Congress Cataloging-in-Publication Data

Names: Pessoa, Luiz, author.

Title: The entangled brain : how perception, cognition, and emotion are woven together / Luiz Pessoa.

Description: Cambridge, Massachusetts : The MIT Press, [2022] | Includes bibliographical references and index.

Identifiers: LCCN 2021061878 (print) | LCCN 2021061879 (ebook) | ISBN 9780262544603 (paperback) | ISBN 9780262372107 (pdf) | ISBN 9780262372114 (epub)

Subjects: LCSH: Perception. | Emotions and cognition. | Brain. | Neuropsychology.

Classification: LCC BF311 .P3767 2022 (print) | LCC BF311 (ebook) |

DDC 153—dc23/eng/20220411

LC record available at <https://lcn.loc.gov/2021061878>

LC ebook record available at <https://lcn.loc.gov/2021061879>