

# **SEX IN THE BRAIN**

A Neuropsychosexual Approach  
to Love and Intimacy

*Janice Hiller*



First published in 2024 by  
Karnac Books Limited  
62 Bucknell Road  
Bicester  
Oxfordshire OX26 2DS

Copyright © 2024 by Janice Hiller

The right of Janice Hiller to be identified as the author of this work has been asserted in accordance with §§ 77 and 78 of the Copyright Design and Patents Act 1988.

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of the publisher.

British Library Cataloguing in Publication Data

A C.I.P. for this book is available from the British Library

ISBN: 978-1-91349-488-9 (paperback)

ISBN: 978-1-91349-489-6 (e-book)

Typeset by vPrompt eServices Pvt Ltd, India



[www.firingthemind.com](http://www.firingthemind.com)

*For my family and friends*

*Living brains, along with their minds—the invisible manifestation of their network level neurobiological functions—reflect a delicate balance, as yet poorly understood, among vastly interacting neural circuits that work in and for living bodies and that respond to the challenges of the world by creating desired circumstances and avoiding those that are harmful. Emotional feelings are the experienced affective manifestations of such interactions; they are the subjective qualities of mind.*

(Panksepp & Bevan, 2012, p. 500)

*We now know that mind, brain and body are indivisible and that disorders traditionally thought of as psychological need to be reconceptualised to include their neurobiological and somatic component ... psychotherapy increases neural integration through challenges that expand our experience of and perspective on ourselves and the world. The challenge of expanding consciousness is to move beyond reflex, fear and prejudice to a mindfulness and compassion for ourselves and others. Understanding the promise and limitations of our brains is but one essential step in the evolution of human consciousness.*

(Cozolino, 2017, p. 417)

# Contents

Preface and acknowledgements	ix
About the author	xiii
Introduction	xv
1. Starting a relationship: initial passion	1
2. Kissing	13
3. Touch, sensuality, and attachment	17
4. Sexual intimacy: arousal, desire, and orgasm	23
5. Commitment and parenting	49
6. Infidelity	55
7. Breaking up and rejection	65
8. Long-term relationships: staying together unhappily	75
9. Long-term relationships: staying together contentedly	83
10. Concluding comments	91
Glossary	95
References	99
Index	111

## Preface and acknowledgements

When I began putting together my ideas on how neuroscience could inform psychosexual therapy I thought there might be enough for a journal article. Then, as I researched deeper into the literature, I found the sheer range of the topic had increased considerably, and the project took off. I had to face the possibility of the article becoming a book, which was at the same time an exciting but daunting prospect. Neurobiology, romantic relationships, and sexual desire are topics I have presented frequently at lectures and workshops for Confer Events, the College of Sexual and Relationship Therapy, and at Tavistock Relationships during the time I was there as academic tutor in psychosexual studies. I have also published papers in peer-reviewed journals on the subject. As I read more I could see how these fascinating areas of neuroscience can offer real insights into how our mind–brain connections enable us to become unique individuals, with a personal identity based on environmental experiences, and with ever-evolving neural networks that will inform our life decisions and our intimate relationships.

People sometimes ask how neuroscience can be useful for clinical work that is really all about emotions and behaviour. My reply is that research into neuroscience can complement therapeutic methods by giving us another lens through which to view the human condition. I try

to explain that neuroscience also demonstrates how we are all embedded in a social and cultural context that has shaped, and continues to shape, our neural circuitry over the lifespan, making it possible to self-reflect, adapt our behaviour, and relate to others. In the public domain there has been a growing awareness and interest in the role of neurotransmitters and brain structures. References to the amygdala, dopamine, and oxytocin are made quite often in the media these days, suggesting that people are curious about how the mind, brain, and the body interact. And when it comes to relationships and sexual desires, many of us would like to know more about the impacts of brain phenomena on our behaviour. My hope is that this book will add to that understanding.

Although I am not a trained neuroscientist, I have been studying the role of neurobiology pertaining to sexual behaviour for more than twenty years. Nevertheless, there may be errors in this book due to the complexity of the subject, the amount of research to cover, and despite my careful reading and cross-checking. This is a very challenging area with many ambiguities, as with most areas in science. I have attempted to understand the issues and give an account of how they may be applied to our sex lives and to psychosexual therapy; and if there are mistakes, they will be due to my struggles with the density of the empirical research. Also, considerable simplification has taken place in the diagrams because I wanted them to convey a visual image of a hugely intricate set of brain pathways and neurotransmitters. Notwithstanding the complexities, I am convinced that learning more about how neural connections underpin all our emotions and behaviours is a worthwhile endeavour and is one that can only deepen our understanding of how we engage with each other and the world.

This book might not have come about without the encouragement of Christina Wipf Perry formerly at Confer/Karnac, who fortunately attended a Confer talk I gave in early 2020. Christina was very positive about providing assistance as I developed the article I was writing into a book. Her confidence that this could happen made a big difference, and I am most grateful for her support. Others at Karnac Books have been helpful as the work progressed. Especial thanks are due to Brigid Hekster who has carefully and generously read and commented on every chapter, providing insightful ideas and suggestions that have undoubtedly

improved the text enormously. I am very grateful to Brigid for her input. Karen Rogers kindly worked on checking the references, which is much appreciated. I would also like to thank Julia Margo, Sonia Sodha, and Stephanie Cohen, who have been enthusiastic about my project, each in their own way, and helped it to be fun. Thanks are definitely due to Steve Salkind, whose analytic approach to complicated research results has aided my understanding. Steve's assistance and technical skills in designing the diagrams with me has been invaluable, and his patience with my focus on getting the book done has given me the space and energy to complete the task.



## About the author

**Janice Hiller** is a consultant clinical psychologist who worked in the NHS in adult mental health initially, before specialising in sexology. She set up and ran the Relationship and Psychosexual Service in North-East London, and then joined Tavistock Relationships as senior academic tutor in psychosexual studies until 2017. Janice has taught on doctoral degree and training courses, presented at many conferences in the UK and abroad, and has published on a range of topics. These include sexual arousal and desire, pain disorders, biopsychosocial factors in sexual development, and neurobiological aspects of sexual responding. She was joint editor and contributor to *Sex, Mind, and Emotion* (Hiller, Wood, & Bolton, 2006), and co-wrote a chapter for the European-wide Syllabus of Clinical Sexology. Janice has a private practice in North London and is especially interested in the relevance of neuroscience in understanding sexual behaviour.

## Introduction

Falling in love is a much longed for experience for many people in our society, and at certain life stages it may become a priority to find someone and begin to develop a romantic partnership. While films and poems describe the thrill of finding the object of passionate love, popular culture is also replete with books and articles on how to manage distressing couple issues. Seeking and developing a relationship is exciting, but after the early intensity the challenge is to maintain the intimacy over time: the pain of unmet needs and shattered beliefs when difficulties emerge is considerable. Why we fall in love with a particular person, how we make the choice, and what we really experience, are all sources of ongoing fascination. When we decide to share our life with another individual we take a significant risk, although it may feel like the right step at the time. Nevertheless, relationship problems can emerge at any phase. Faced with the task of working with a range of issues, psychosexual therapists have looked to an integrated model of therapy, as research and practice have enhanced our understanding of both sexual behaviour and treatment modalities. Therapy models typically combine psychodynamic approaches with behavioural exercises, psychoeducation, systemic techniques, mindfulness, and cognitive behavioural therapy.

Neuroscience has recently addressed the topic of romantic relationships, based on advances in genetics and brain scanning methods during the last twenty years. Increasingly sophisticated techniques such as functional magnetic resonance imaging (fMRI), and positron emission topography (PET) have highlighted which brain areas become activated during specific emotional states and behaviours, and have enabled research into the neurobiology of sexuality, love, attachment, and romantic attraction to grow considerably. Research has addressed various questions, including how the flood of emotions when romantic partners first meet becomes a stable bond; what underpins the chemical changes that transform early obsessive preoccupation into a secure loving attachment, and how do the emotional and voluntary behavioural systems in the brain link with genital changes? Connections between sexual activity, cognitions, and emotional processes have also been studied using sensitive hormonal assay equipment to measure the levels of identified hormones released from specific neural pathways. Results from this line of investigation have led to further understanding of the hormones circulating in the bloodstream during sexual activity and their impact on emotional responses.

Although as a topic neuroscience may appear antithetical to talking therapies, I see psychosexual therapy as an approach that can potentially address complex relationship difficulties more effectively when it embraces scientific advances, rather than relying solely on well-described techniques. I also think we can manage our interpersonal responses better when we have some understanding of how the brain works when we experience strong emotions such as excitement, urge, anger, and anxiety, and encounter problems with a partner. Research into other areas of psychological and behavioural distress, such as eating disorders (Steinglass et al., 2019), childhood trauma (Banihashemi et al., 2020), and assault (Giotakos, 2020), has explored how brain-based concepts could guide and advance treatment methods.

My aim here is to address the question of whether neuroscience can offer insights into what happens to intimacy between people over time, from initial meeting to staying together or parting, and including the possible, but not essential, stages of couple relationships. Some aspects in this book will not be relevant to every couple, and others have not been the subject of scientific scrutiny into human behaviour. Much of

the early work on the neurobiology of relationships and attachment has emanated from extensive research into the mating patterns and sexual response of other mammals, especially those who form pair bonds, and whose subcortical systems of the emotional-limbic brain are regulated by hormones, with significant similarities to our own. By contrast though, humans have evolved complex neocortical structures in the brain for abstract thinking and problem-solving, which differentiate us from other mammals. Specifically, our prefrontal cortex creates higher mental processes, enabling a mind with conscious reflection, the awareness of personal identity and feelings, and the potential to make choices (Panksepp & Biven, 2012).

Human relationships are also endlessly complex, involving the pull of conscious and unconscious processes, societal expectations, and what Damasio (2000, p. 58) described as the challenge of applying reason to “the pervasive tyranny of emotion”. In neurobiological terms, the application of reason depends on the ability of the prefrontal cortex, our region for rational thought and awareness, to modulate responses in the amygdala, where emotions are instantly appraised and translated into bodily states. At the centre of learning to manage emotions is the recent understanding of neuroplasticity—the formation of new neural connections and pathways in response to environmental input; and the concept of neurogenesis—the ability of the brain to grow new neurons. Therapeutic work facilitates neural network growth by providing a safe learning environment, and an emotionally meaningful context, for the co-construction of narratives. In Cozolino’s view (2017) psychotherapists are applied neuroscientists who resculpt the brain’s neural networks and promote neural integration, through empathy, behavioural experiments, and emotional attunement.

Oxytocin has now become recognised as crucial for emotional bonding, safety, and security between romantic partners, and also for the creation of caregiver–infant bonds. As we shall see later there is considerable overlap between these two brain states, with the clear distinction that romantic love also involves brain regions that are active in sexual arousal. Vasopressin differs only slightly in structure to oxytocin, and some functions are similar, but there are interesting gender differences, with men having higher plasma levels of vasopressin than women (Ishunina & Swaab, 1999). According to Panksepp and Biven (2012),

oxytocin and vasopressin are social sexual peptides that encourage emotionally expressive traits, and moreover these traits typically show distinctions between men and women. Higher vasopressin levels in men promote competitive and aggressive behaviours, while oxytocin encourages more nurturing behaviours, often shown by women. These are gender-typical patterns only and reflect a biostatistical concept. Most individuals express a combination of traits, depending on unique developmental and environmental factors.

Romantic relationships must start with the first meeting, a recognition between two people that a connection is forming, moreover one that could be meaningful and rewarding. How this happens, why individuals are initially drawn to each other, and all this signifies about attachment, object relations, and unconscious hopes, is of great interest, but is currently beyond the scope of neuroscientific research. A theoretical explanation for how partner choice is made has been proposed by Marazziti and Baroni (2012). They suggest a rapid response in the amygdala, the brain's instant response centre, to assess emotional tone and danger when possible partners meet, which is then registered in the hippocampus. Emotional memories and early childhood experiences with caregivers are stored in the hippocampus, enabling the individual to select a partner who evokes positive mental states, according to the above theory. However, as clinicians we know that complex choices are often made based on unresolved developmental issues (Ruszczynski, 1992), so partner choice can also be potentially dysfunctional, as well as ultimately stabilising and health promoting. Perhaps the amygdala–hippocampus link is the neurobiological pathway for recognising a significant other who might connect us to developmental issues, whether the unconscious wish is to repeat what was good, or repair what was bad or missing. Nevertheless, the initial awareness that this person seems important is understood to create an altered mental state, characterised by elated mood and exhilaration. Methods now exist to explore this state scientifically, but empirical research can take place only after the initial recognition and sense of connection between two people has taken place.

Neuroscience illustrates the basic human need to connect to others, and how our thoughts, emotions, and behaviours—brain based activities reliant upon multiple neural pathways—underlie the nature of those

connections. This book is therefore an attempt to give an overview of the neurobiological mechanisms involved in love, sex, and intimacy, and to consider how neuroscience has the potential to enhance relationships and psychosexual therapy through the insights offered from this expanding area of research. In the brief case vignettes at the end of each chapter I have tried to show how including neurobiological descriptions of psychological states can add depth to therapy practice. These vignettes are composites from my work over the years and are not intended to illustrate a complete treatment model. I suggest the use of the term neuropsychosexual, to describe an approach to sexual and relationship issues, that contains an understanding of brain phenomena and their role in the expression of love and sex.