The Scientific History of Mindfulness: 1938 to 2020

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May all beings have happiness and the causes of happiness

May all beings be free from suffering and the causes of suffering

'In SSR, Kuhn defined incommensurability as the inexistence of a neutral ground from which to compare competing paradigms. Any attempt to evaluate their merits is made under the assumptions of one particular paradigm. This would lead to the inability of the proponents of each paradigm to "(…) make complete contact with each other's viewpoints".'

Juan Gefaell and Cristian Saboridoin "Incommensurability and the extended evolutionary synthesis: taking Kuhn seriously." *European Journal for Philosophy of Science* 12, no. 2 (2022): 24.

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This project is intended to increase our scientific understanding of meditation and how it improves health, wellbeing, and resilience. In this transdisciplinary enterprise, a complete list of those, from multiple disciplines, who have directly aided this research would be impractical. To avoid unwittingly omitting anyone, I thank all those who have contributed to my progress, including my peers, students, teachers and my teachers' teacher. I also acknowledge the role of two institutions in developing my research trajectory: my alma mater, The Open University, and The University of Kent, where a Scholarship provided a valuable platform for this work. In addition to those named here, this research would never have been completed without direct and indirect help from countless staff working at every level at the University of Kent.

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Abstract

Since 1970, scientists have been investigating the therapeutic effects of religious meditation methods. Thousands of preliminary experiments claim psychological benefits from mindfulness practices. Over the last 20 years, many stakeholders from different sections of society, including science, politics, and the business community, have supported a 'mindfulness revolution'. The current purported benefits of mindfulness are so widespread that they extend well beyond health and wellbeing. Social policy agents even advocated using mindfulness in schools to support the UK's future economic performance. However, there is a limiting contradiction in mindfulness research. The narrative that mindfulness's benefits are scientifically validated has been challenged for decades by methodologically robust scientific reviews. These two conflicting evaluations have led to growing concerns among meditation scientists. A major investigation in 2018 by Nicholas Van Dam and 14 co-authors argued that the hyping of poor-quality preliminary results could harm mindfulness consumers. Major research findings since 2020 have supported a more critical evaluation of claims made for the benefits of mindfulness.

Two overarching research questions drive this thesis: firstly, how and then why did mindfulness, originally a belief-based practice, become an important object of scientific interest? Throughout this project, understanding how the contradictory views of mindfulness research were developed and maintained has become increasingly important. By applying a transdisciplinary approach, including history of science methodologies, this thesis seeks to contribute new insights to the extensive body of meditation and mindfulness research. Proceeding chronologically, starting in 1938 with William Grey Walter's EEG experiments of the effects of meditation, this research focuses on analysing the creation, distribution, impact and methodological problems of several paradigmatic studies in the field; highlighting the

evolution of mindfulness from earlier scientific engagement with meditation. This thesis focuses on clinical and scientific research conducted primarily in the psychological sciences. It also explores how mindfulness has been medicalised, that is, the relocation of religious mindfulness methods into medico-scientific domains and beyond.

In creating a mindfulness-based stress reduction technique (MBSR) in 1979, Jon Kabat-Zinn claimed to have founded a conceptual bridge between Buddhist and scientific knowledge. Through case study analysis, it seems likely that rather than integrating religion and science, MBSR was uncoupled from theoretical frameworks. This novel medicalised approach led to a pragmatic paradigm where early-stage experiments frequently found evidence of health benefits without demonstrating how improved patient outcomes were arrived at. Free of overarching testable hypotheses, the MBSR concept was extremely flexible, supporting the proliferation of the technique. Lacking robust scientific replication, dramatic claims based on preliminary mindfulness studies were often contested by scientific reviews. This tension between positive early-stage experiments and more sceptical overarching investigations became a paradox, leading to a crisis in mindfulness research.

This scientific history illustrates that perceptions of the relationship between science and religion depend on many factors, including the cultural context and the beliefs of individual scientists. Therefore, systemic limitations potentially exist wherever religious knowledge is relocated to scientific domains. Significant work is necessary to establish the extent to which science adopts an 'outsider' perspective when engaging with non-scientific knowledge. Like previous studies, this thesis argues for improvements in meditation and mindfulness research. However, MBSR may partially reflect a rejection of mechanistic understandings and treatment of health conditions through approaches such as Randomised Controlled Trials (RCTs). Further research is also recommended to develop new ontological and epistemological understandings that could support more reliable scientific investigations of traditional meditation and practices.

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Table of Abbreviations

ACT	Attention Control Therapy
CBT	Cognitive Behavioral Therapy
EEG	Electroencephalogram or Electroencephalographic
HoS	History of Science
MAPPG	Mindfulness All Party Parliament Group
MBCT	Mindfulness-Based Cognitive Therapy
MBI	Mindfulness-Based Intervention
MBSR	Mindfulness-Based Stress Reduction
MtH	Mind the Hype: A Critical Evaluation and Prescriptive Agenda for Research on Mindfulness and Meditation
NICE	National Institute of Clinical Excellence, later renamed National Institute for Health and Care Excellence
RCT	Randomised Clinical Trial
RoS	Religion of Science
RR	Relaxation Response
SRC	Stress Reduction Clinic
SR&RP	Stress Reduction and Relaxation Program
TAU	Treatment as Usual
TM	Transcendental Meditation
UAE	Unwanted Adverse Effects
UMMS	University of Massachusetts Medical School

Introduction

1. Introduction

During the 1950s, Eastern spiritual knowledge was viewed as a possible solution to declining mental health in some Western states, particularly the USA and the UK.[1] By the 1970s, scientists had begun the process of relocating traditional spiritual practices from Hinduism and Buddhism into medico-scientific contexts, claiming that meditation might be a low-cost panacea.[2] The most successful of these relocated interventions was Mindfulness-Based Stress Reduction (MBSR), which catalysed a 'mindfulness revolution' that emerged after 2010.[3] A major scientific and scholarly investment has been undertaken to demonstrate the health benefits of practising mindfulness, including the publication of over 30,000 peer-reviewed papers.[4] However, robust scientific validation of mindfulness's positive effects remains elusive. This tension between enthusiastic claims for practising mindfulness and a lack of reliable replicated evidence has given rise to my characterisation of the last four decades of mindfulness research as 'promising but not proven'. Unfortunately, the growth in problematic mental health identified in the 1950s has not been resolved; therefore, demonstrating mindfulness's health potential is still a major concern for scientists and clinicians.

[1] For insight into the growing concerns about declining mental health in the USA during the late 1950s and the potential role of Buddhism in resolving the issue see: Erich Fromm, 'Psychoanalysis and Zen Buddhism', *Psychologia*, 2.2 (1959), 79–99 <https://doi.org/10.2117/psysoc.1959.79>.
[2] Wallace proposed the widespread adoption of TM meditation in medical settings, see. Robert Keith Wallace, 'Physiological Effects of Transcendental Meditation', *Science*, 167.3926 (1970), 1751–54 <https://doi.org/10.1126/science.167.3926.1751>.
[3] For an overview of the scale of interest of mindfulness in 2011 see *The Mindfulness Revolution: Leading Psychologists, Scientists, Artists, and Meditation Teachers on the Power of Mindfulness in Daily Life*, ed. by Barry Boyce (Boston: Shambala, 2011), p. 288.
[4] Figure 1 demonstrates that on September 29th 2023, there were 29,045 articles in the Scopus database linked to mindfulness. That figure has since risen to over 30,000.

Before the UK's Coronavirus (COVID-19) pandemic, one in four adults experienced a mental health problem in any given year, and one in ten children had a diagnosable mental health issue.[5] In 2019, the COVID-19 pandemic pushed health worries to the top of national and international political agendas. Research indicated the overall effect of the pandemic was to worsen mental health.[6] Data published in 2022 stated the cost of poor mental health to the UK economy is now £118 bn a year.[7] There is also evidence that most of those experiencing mental illness receive no treatment in either poor or prosperous nations.[8]

Seeking ways of alleviating suffering is a worthy goal of the psychological sciences. Over the last seven decades, belief-based meditation has attracted the attention of clinicians, scientists, and even politicians because of its claimed health potential. Since 1970, meditation in general and mindfulness in particular have been proposed as a solution to multiple health, wellbeing, and socio-economic problems.[9] A search of the Scopus database of peer-reviewed literature was conducted on the 29th of September, 2023, for the term 'mindfulness' in the title, abstract, or keyword of indexed articles from 1960. (Figure 1) A total of 29,045 entries were reported; this estimate gives a sense of the scale of scholarly interest in mindfulness. Throughout the thesis, Scopus data has been used to establish trends in the growth of published

[5] NHS England, 'Five Year Forward Plan for Mental Health'. (2016) <https://www.england.nhs.uk/mentalhealth/wp-content/uploads/sites/29/2015/09/fyfv-mental-hlth-taskforce.pdf> [Accessed 29 September 2023]. p. 5.

[6] Nicole Wallbridge Bourmistrova and others, 'Long-Term Effects of COVID-19 on Mental Health: A Systematic Review', *Journal of Affective Disorders*, 299 (2022), <https://doi.org/10.1016/j.jad.2021.11.031>, pp. 118–225.

[7] London School of Economics and Political Science, 'Mental Health Problems Cost UK Economy at Least £118 Billion a Year - New Research', *London School of Economics and Political Science*.<https://www.lse.ac.uk/News/Latest-news-from-LSE/2022/c-Mar-22/Mental-health-problems-cost-UK-economy-at-least-118-billion-a-year-new-research.aspx> [Accessed 15 January 2023].

[8] Sara Evans-Lacko and others, 'Socio-Economic Variations in the Mental Health Treatment Gap for People with Anxiety, Mood, and Substance Use Disorders: Results from the WHO World Mental Health (WMH) Surveys', *Psychological Medicine*, 48.9 (2018), pp. 1560–71. <https://doi.org/10.1017/S0033291717003336>. pp. 1560–1563.

[9] This trend began with Wallace's 1970 journal article promoting the use of Transcendental Meditation (TM): Robert Wallace, 'Physiological Effects of Transcendental Meditation'.The MAPPG report, *Mindful Nation,* provides a detailed exploration of the presumed benefits of mindfulness in the UK in 2015. It will be analysed in more detail in Chapter 7. MAPPG, *Mindful Nation*, 2015. <https://www.themindfulnessinitiative.org/mindful-nation-report>. [Accessed 29 September 2023].

meditation research. However, the figures may include a number of spurious correlations or duplicate entries.

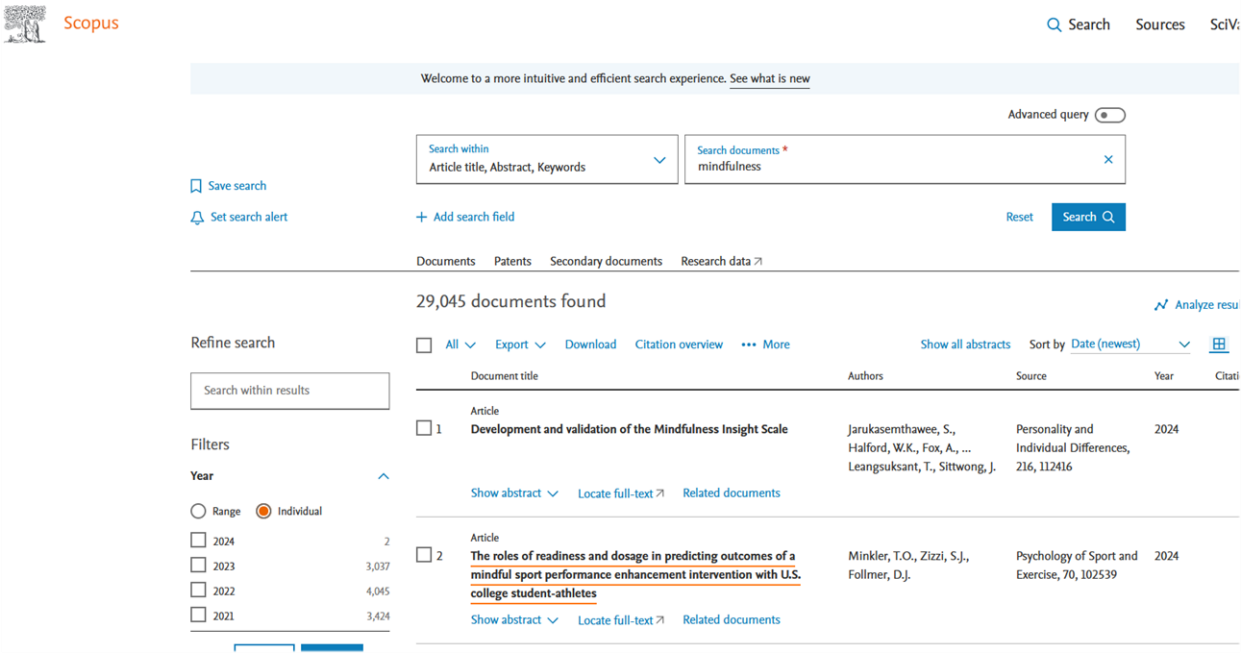

Fig. 1. Screen capture of a Scopus database search results for 'mindfulness' from 1960 to the present.[10]

Despite this extensive body of work from different disciplines, many claims about the benefits of mindfulness are contested within the scientific community. This conflict has led to uncertainty about the status and value of mindfulness research. This tension between the positive findings published in thousands of mostly preliminary studies and their critical reception by authoritative scientific reviews rests at the heart of this thesis: how and why do two mutually exclusive positions exist in the scientific accounts?

A body of literature produced from a history of science (HoS) perspective has documented how new health technologies and non-scientific treatments gain popularity and are, over time, accepted or rejected by the medico-scientific mainstream. This thesis has been

[10] Elsevier, Document Search 'mindfulness', *Scopus*, 2023. <https://www.scopus.com/results/results.uri?sort=plf-f&src=s&st1=Mindfulness&sid=c0d8c699f3bc9ea210bb3224b6c9c444&sot=b&sdt=b&sl=26&s=TITLE-ABS-KEY%28Mindfulness%29&origin=searchbasic&editSaveSearch=&yearFrom=Before+1960&yearTo=Present&sessionSearchId=c0d8c699f3bc9ea210bb3224b6c9c444&limit=10> [Accessed 29 September 2023].

inspired by and draws on some of these projects' theoretical and methodological approaches. Three areas in particular, discussed in the Methodology section below, have offered signposts for this investigation: histories of phrenology, mesmerism, and acupuncture. However, the trajectory of mindfulness has additional complexities because it was developed from a range of Eastern spiritual practices that the founder of Westernised mindfulness, Jon Kabat-Zinn, claimed to have integrated with science. Therefore, I give attention to the world views of science and Buddhist traditions and the places where they overlap. Social science approaches also provide foundations for examining the under-researched relationship between scientists, science, and belief. An investigation by Renny Thomas has directed my insights into the influence of the religious convictions of scientists on science creation.[11] As such, this thesis is the first transdisciplinary scientific history of mindfulness; it analyses how our current understandings were arrived at, illustrates the scientific implications of research findings, and offers signposts to improved research and practice to the contemplative science community and the millions of mindfulness consumers.

As described in Chapter 2, formal scientific investigation of the effects of meditation on human physiology began in the late 1930s.[12] Meditation research progressed slowly until 1970, when claims for the health benefits of Transcendental Meditation (TM), a practice originating in Hindu traditions, began to shift the boundaries between science and religious thought and methods.[13] These changes delivered new knowledge seized on by scientists and clinicians keen to exploit the presumed health benefits of belief-based meditation. Kabat-Zinn was part of this movement, developing Mindfulness-Based Stress Reduction (MBSR) in

[11] Renny Thomas, 'Beyond Conflict and Complementarity Science and Religion in Contemporary India', *Science, Technology and Society*, 23.1 (2018), 47–64. <https://doi.org/10.1177/0971721817744444>. [Accessed 21 September 2022]

[12] Walter, William Grey, 'Critical Review: The Technique and Application of Electro-Encephalography', *Journal of Neurology, Neurosurgery & Psychiatry*, 1.4 (1938), 359–85. <https://doi.org/10.1136/jnnp.1.4.359>. p. 373.

[13] Robert Keith Wallace, 'Physiological Effects of Transcendental Meditation'.

1979.[14] Kabat-Zinn established a new Western pan-spiritual concept of mindfulness, originally based on an aggregation of ideas from multiple Eastern religious and philosophical traditions, developing a new but untested treatment for chronic pain. Dramatic claims for the benefits of mindfulness increased popular and scientific interest in the concept, leading to the development of a mindfulness revolution that, by 2011, extended far beyond medico-scientific communities.[15] A key goal of this scientific history is to explore how a claimed convergence between scientific processes and non-scientific religious practices enabled mindfulness to become a major health and wellbeing intervention.

The introduction of religious knowledge into experimental settings did not happen by accident. During the 1950s, there was a growing openness in the West to the healing potential of Eastern spiritual practices; the British religious studies scholar Alan Watts was particularly active in this field.[16] By 1959, psychologist Erich Fromm and Zen teacher Daisetsu Teitaro Suzuki collaborated to develop a health intervention based on a fusion of Eastern and Western insights called Zen Psychotherapy.[17] The acceptance of Eastern understandings of mind and matter during the 1950s was part of a much broader Counter-culture movement that developed in many industrialised nations. Theodore Roszak's reflections on the Counter-culture integrated the political and social elements of the trend with a growing rejection of mechanistic approaches to health.[18] In addition, this cultural shift also led to a reconsideration of disciplinary boundaries, including those between medicine, belief, and science.[19] This re-evaluation

[14] The first report on the early mindfulness experiments was published in 1982, see Jon Kabat-Zinn, 'An Outpatient Program in Behavioral Medicine for Chronic Pain Patients Based on the Practice of Mindfulness Meditation: Theoretical Considerations and Preliminary Results', *General Hospital Psychiatry*, 4.1 (1982), 33–47 <https://doi.org/10.1016/0163-8343(82)90026-3>.
[15] Barry Boyce. The revolution is discussed in more detail in Chapter 7.
[16] Alan W. Watts, 'Asian Psychology and Modern Psychiatry', *American Journal of Psychoanalysis*, 13.1 (1953), pp. 25–30.
[17] Fromm was a psychologist and psychoanalyst who worked with Suzuki to seek solutions to a perceived mental health crisis, see Erich Fromm, 'Psychoanalysis and Zen Buddhism'. p. 80.
[18] Theodore Roszak, *The Making of a Counter Culture: Reflections on the Technocratic Society and Its Youthful Opposition.* (New York: Doubleday & Company Inc. 1969).
[19] Fromm was a leader in this field, but for greater detail and background, see Roszak, *The Making of a Counter Culture: Reflections on the Technocratic Society and Its Youthful Opposition.* pp. 124-155.

challenged medical orthodoxy and opened up the possibility that Eastern religious practices might hold answers to Western health challenges.

In the USA in 1970, Robert Wallace published experimental results claiming TM could be used in Western clinical settings to treat various health conditions.[20] In his first peer-reviewed study, 'The Physiological Effects of Transcendental Meditation', Wallace claimed that experiments had shown promising results. This work generated great interest in the 1970s, attracting established health researchers such as Herbert Benson to the study of meditation.[21] Building on the progress made by Wallace, Benson and others, Kabat-Zinn began using MBSR as a chronic pain treatment in 1979.[22] Scientific interest in MBSR remained limited for the first twenty years following its introduction. However, the use of mindfulness as an adjunct to Cognitive Behavioural Therapy (CBT) in treating clinical depression led to the publication of successful trials for Mindfulness-Based Cognitive Therapy (MBCT) in 2000.[23] MBCT was a major departure from MBSR, which was developed by an international group of cognitive scientists working at institutions in Canada, England, and Wales. As described in Chapter 5, the 2000 MBCT study 'Prevention of Relapse/Recurrence in Major Depression by Mindfulness-Based Cognitive Therapy' introduced a much more robust scientific approach to mindfulness research. Unlike earlier mindfulness experiments, MBCT was generally accepted

[20] The journal article marks the start of the medicalised meditation movement, discussed in Chapter 3, see Robert Keith Wallace, 'Physiological Effects of Transcendental Meditation'.
[21] Benson initially entered into a short-lived partnership with Wallace before following his own trajectory. See Herbert Benson, Martha M. Greenwood, and Helen Klemchuk, 'The Relaxation Response: Psychophysiologic Aspects and Clinical Applications', *The International Journal of Psychiatry in Medicine*, 6.1–2 (1975), 87–98 <https://doi.org/10.2190/376W-E4MT-QM6Q-H0UM>.
[22] While Kabat-Zinn made claims for the benefits of mindfulness in his initial trials, he also highlighted the need for more robust methodological approaches, see Jon Kabat-Zinn, 'An Outpatient Program in Behavioural Medicine for Chronic Pain Patients Based on the Practice of Mindfulness Meditation: Theoretical Considerations and Preliminary Results'.
[23] John D. Teasdale and others, 'Prevention of Relapse/Recurrence in Major Depression by Mindfulness-Based Cognitive Therapy', *Journal of Consulting and Clinical Psychology*, 68.4 (2000), 615–23 <https://doi.org/10.1037/0022-006X.68.4.615>.

as a scientifically validated health intervention and endorsed for use in the NHS in 2004.[24] Riding on the success of MBCT, mindfulness entered the scientific mainstream. Over the following two decades, particularly in the US and UK, mindfulness became one of the most researched mind-training therapies supported by different stakeholders across society, leading to an extraordinary proliferation of the concept.[25]

Alongside the enthusiasm for mindfulness, there was evidence that methodological and conceptual uncertainty was still limiting scientific understanding.[26] The status of MBCT as scientifically validated proved to be rare in mindfulness research. Many mindfulness experiments were criticised in systematic reviews for their low quality. Despite these concerns, peer-reviewed papers continued to generate impressive preliminary claims, shunning causal explanations in favour of evidence of positive clinical potential.[27] Contested mindfulness research eventually led to a problematic conflict in the scientific community. Impressive findings generated by preliminary studies were often found to be promising but unproven by systematic reviews applying a more rigorous interpretation of the scientific method. Therefore, published papers offered conflicting evaluations of mindfulness experiments. Throughout this account, I describe this contradiction as the 'mindfulness paradox'; analysing its formation and maintenance are key goals of my methodology.

To introduce the structure of the thesis, I will briefly describe and conceptually link the following chapters of this account. The claim that MBSR was congruent with science and traditional knowledge systems is a major element of the mindfulness paradigm. This issue is

[24] Rebecca S. Crane and Willem Kuyken, 'The Implementation of Mindfulness-Based Cognitive Therapy: Learning From the UK Health Service Experience', *Mindfulness*, 4.3 (2013), 246–54 <https://doi.org/10.1007/s12671-012-0121-6>.
[25] For evidence of the enthusiastic disciplinary acceptance of mindfulness, see Barry Boyce.
[26] Although strategic reviews critical of mindfulness were published regularly after 2002, this 2018 paper was the most influential, see Nicholas T. Van Dam and others, 'Mind the Hype: A Critical Evaluation and Prescriptive Agenda for Research on Mindfulness and Meditation', *Perspectives on Psychological Science*, 13.1 (2018), 36–61 <https://doi.org/10.1177/1745691617709589>.
[27] Scott R. Bishop, 'What Do We Really Know About Mindfulness-Based Stress Reduction?', *Psychosomatic Medicine*, 64.1 (2002), 71–83.

central to understanding the scientific history and the current configurations of mindfulness and is yet to be fully explored in any scientific work. Chapter 1 discusses the theoretical frameworks of Buddhist schools and the potential that MBSR was able to bridge science and religion. The subsequent chapters follow a chronological structure. Chapter 2 describes the origins of scientific engagement with meditation from 1938 to 1969. In this period, scientists studied meditation traditionally, using experiments to observe its physiological effects on practitioners. Interestingly, much of the most important early experimental work was conducted in India and Japan. I describe the dramatic shift in scientific engagement to the USA and the UK between 1970 and 1984 in Chapter 3. Wallace's claims about the health benefits of TM led to the development of the medicalised meditation approach that ran parallel to traditional scientific experiments. Chapter 3 also describes the scientific impact of the medicalised movement and Kabat-Zinn's creation of the medicalised mindfulness concept through the invention of MBSR.

Chapter 4 explores the consolidation and early proliferation of MBSR between 1985 and 1990. During this period, mindfulness expanded into new areas and forms, developing the mindfulness paradigm through a plethora of Mindfulness-Based Interventions (MBIs). Despite the diversification of mindfulness up to 1990, the technique received very little scientific attention. Chapter 5 illustrates a significant stage in the scientific history between 1991 and 2000, the creation of MBCT. MBCT's success led to a much broader acceptance of the mindfulness concept, dramatically increasing published research described in Chapter 6. However, between 2001 and 2010, more scientific interest also led to closer scrutiny of mindfulness by meta-studies and strategic reviews. Despite concerns from within the scientific community, the speed of the mindfulness revolution increased after 2011; the dramatic growth is documented in Chapter 7. As this decade progressed, criticisms challenged the mindfulness

paradigm, and scientists warned that the hyping of poor-quality research could harm consumers. The meta-conclusions of the thesis are then presented in Chapter 8.

2. Definitions: 'Meditation', 'Mindfulness' and 'Medicalised'

A lack of clarity about what mindfulness is and how it works has had a major influence on creating the mindfulness paradox. Therefore, in describing and analysing the history, careful attention is given to defining the terms meditation, mindfulness and medicalised. Both in popular discourses and scientific literature, meditation and mindfulness have a range of meanings. This issue is further complicated because the relocation of mindfulness to the West has created more subsets of meditation practices, some devoid of any theoretical framework; in such conditions, continued uncertainty seems inevitable. In their review of mindfulness research, Håkan Nilsson and Ali Kazemi describe some of the problems of terminology:

> Some mindfulness researchers offer definitions, whereas others do not and take the definition of mindfulness for granted. Beyond the problem of defining mindfulness, the fact that the phenomenon is of great interest to various disciplines, each of which has its own theoretical and methodological approaches, different authors use different terms in describing this phenomenon.[28]

A useful starting point for the classification of mindfulness is to think of meditation as an overarching term from which many subsets of methods cascade down, including mindfulness. In the context of this thesis, meditation is a broad description of systematic mind training methods. In a 2022 paper, 'A Review of the Methodology, Taxonomy, and Definitions in Recent FMRI Research on Meditation', Maria Engström and others offered a generalised

[28] Håkan Nilsson and Ali Kazemi, 'Reconciling and Thematizing Definitions of Mindfulness: The Big Five of Mindfulness', *Review of General Psychology*, 20.2 (2016), 183–93 <https://doi.org/10.1037/gpr0000074>.

definition: ‘Meditation practice, traditionally aiming for altered states of consciousness and spiritual development, is increasingly applied for the promotion of good health.’[29] In 2008, Antoine Lutz and others attempted to define meditation for scientific audiences: ‘The term ‘meditation’ refers to a wide variety of practices, ranging from techniques designed to promote relaxation to exercises performed with a more far-reaching goal, such as a heightened sense of well-being.’[30] While a general description of meditation is necessary because of the range of methods the term encompasses, the demands of experimental investigations require a much more precise understanding of any specific practice being studied, ideally describing, cognitively, how the technique mediates mental processes, states and traits.

An additional complication with definitions of mindfulness is the potential contrasts between Eastern and Western meanings. In a spiritual context, mindful (myndeful) first appeared in (Middle) English in Wycliffe’s Bible, a Latin translation dated around 1382.[31] The Oxford English Dictionary (OED) attributes the first English use of mindfulness in a Buddhist context to a scholar of Asian languages, Monier Williams, in 1889.[32] He translated the Pali term *sati* as ‘right mindfulness’, one of the eight elements of the spiritual path described in Buddhist scriptures.[33] The first use of mindfulness meditation found in the peer-reviewed literature in a modern therapeutic context was recorded in 1975 by Gary Deatherage as a

[29] Maria Engström, Johan Willander, and Rozalyn Simon, ‘A Review of the Methodology, Taxonomy, and Definitions in Recent fMRI Research on Meditation’, *Mindfulness*, 13.3 (2022), 541–55 <https://doi.org/10.1007/s12671-021-01782-7>.
[30] Antoine Lutz, Heleen A. Slagter, and others, ‘Attention Regulation and Monitoring in Meditation’, *Trends in Cognitive Sciences*, 12.4 (2008), 163–69 <https://doi.org/10.1016/j.tics.2008.01.005>.
[31] Oxford English Dictionary, ‘Mindful’ (Online) <https://www.oed.com/search/advanced/HistoricalThesaurus?textTermText0=mindful&textTermOpt0=WordPhrase> [accessed 30 September 2023].
[32] Oxford English Dictionary, ‘Mindfulness’ (Online) <https://www.oed.com/dictionary/mindfulness_n?tab=meaning_and_use> [accessed 30 September 2023].
[33] Malcolm Huxter, ‘Mindfulness and the Buddha’s Noble Eightfold Path’, in *Buddhist Foundations of Mindfulness*, ed. by Edo Shonin, William Van Gordon, and Nirbhay N. Singh, Mindfulness in Behavioral Health (Cham: Springer International Publishing, 2015), pp. 29–53 <https://doi.org/10.1007/978-3-319-18591-0_3>.

translation for a traditional Buddhist meditation, *satipatthana*.[34] In 1978, Ellen Langer and others began investigating the Western concept of mindfulness, creating an important body of research from a conventional psychological perspective.[35] Langer and others began to analyse the relationship between attention (mindfulness/mindlessness) and behaviour. This conclusion from their 1978 study illustrates the positivist nature of this area of mindfulness research: 'These studies taken together support the contention that when the structure of a communication, be it oral or written, semantically sound or senseless, is congruent with one's past experience, it may occasion behavior mindless of relevant details.'[36]

In contrast, in 1982, Kabat-Zinn described his version of mindfulness as a pan-spiritual concept synthesised from an undelared number of Eastern spiritual practices:

> Mindfulness meditation has roots in Theravada Buddhism where it is known as *sattipatana vipassana* or Insight Meditation, in Mahayana Buddhism in Soto Zen practices, and in the yogic traditions as expressed in the contemporary writings of J Krishnamurti, Vimla Thakar, and Nisargadatta Maharaj.[37]

Kabat-Zinn's definition had an uncertain relationship with the pre-existing understanding of mindfulness from Eastern and Western perspectives. The lack of a single scientific definition of Kabat-Zinn's version of mindfulness created a conceptual vacuum, which, over time, has been filled with attempts to elaborate the early general descriptions of the concept. In 2011, David Black demonstrated the expansion of definitions based on one of Kabat-Zinn's explanations:

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[34] Gary Deatherage, 'The Clinical Use of "mindfulness" Meditation Techniques in Short-Term Psychotherapy.', *The Journal of Transpersonal Psychology*, 7.2 (1975).
[35] Ellen J. Langer, Arthur Blank, and Benzion Chanowitz, 'The Mindlessness of Ostensibly Thoughtful Action: The Role of "Placebic" Information in Interpersonal Interaction', *Journal of Personality and Social Psychology*, 36 (1978), 635–42 <https://doi.org/10.1037/0022-3514.36.6.635>.
[36] Ellen J. Langer, Arthur Blank, and Benzion Chanowitz, p. 641.
[37] Jon Kabat-Zinn, 'Some Reflections on the Origins of MBSR, Skillful Means, and the Trouble with Maps', *Contemporary Buddhism*, 12.1 (2011), 281–306 <https://doi.org/10.1080/14639947.2011.564844>. p. 34.

> One of the most well-recognized Western definitions of mindfulness comes from Dr. Jon Kabat-Zinn, one of the central founders of the field for which I coin the term here mindfulness science. He defined mindfulness as, "paying attention in a particular way: on purpose, in the present moment, and nonjudgementally". His use of the term mindfulness has become the landmark definition; however, similar conceptual definitions were soon to follow his work. These definitions include (a) an open and receptive attention to and awareness of what is occurring in the present moment; (b) an awareness that arises through intentionally attending in an open, accepting, and discerning way to whatever is arising in the present moment; (c) an attention that is receptive to the whole field of awareness and remains in an open state so that it can be directed to currently experienced sensations, thoughts, emotions, and memories; and (d) waking up from a life lived on automatic pilot and based in habitual responding.[38]

Black illustrates the challenges of defining mindfulness 30 years after MBSR was first deployed. There are still no universally accepted scientific or semantic definitions, and many different versions of mindfulness now exist in the scientific literature.[39]

In this thesis, when used in isolation, the term meditation is the overarching category encompassing all forms, old or new, secular or spiritual, including mindfulness. The words 'practice', 'method' and 'training' are used interchangeably with 'meditation', reflecting the language adopted in the respective scientific accounts. The main research object in this investigation is the MBSR concept and its derivatives, MBIs. Therefore, when the term 'mindfulness' is used alone, it refers to the families of practices linked to Kabat-Zinn's original construct, MBSR, and its widespread proliferation. Religious or spiritual methods are indicated by the prefixes 'traditional' or 'belief-based' or a denominational identifier, for example, 'traditional meditation' or 'Buddhist mindfulness'. The Western psychological understanding of mindfulness/mindlessness, associated with Langer and others, is described as Langarian mindfulness.[40]

[38] Black David, 'A Brief Definition of Mindfulness', *Behavioral Neuroscience*, 7.2.109 (2011), 1–2. p. 1.
[39] For the landmark 2016 catalogue of different cognitive versions of the mindfulness concept see Nilsson and Kazemi.
[40] Langer, Blank, and Chanowitz, 'The Mindlessness of Ostensibly Thoughtful Action'.

Clearly defined terms are central to experimental research. If a mental state or therapeutic practice is open to interpretation, it can lead to problems in creating continuity in scientific understanding and treatment. Usually, a preliminary experiment in psychology must be reliably repeated to confirm the initial results (replication). Replication is typically the path to scientific validation; without it, claims coming from preliminary and pilot studies must be treated cautiously. Psychologist Gregory Francis described the importance of replication in his 2012 discussion: 'Like other scientists, psychologists believe experimental replication to be the final arbiter for determining the validity of an empirical finding.'[41] Although Francis argued that replication alone does not guarantee scientific validation, the lack of it is problematic. As well as a meditation method, 'mindfulness' is also used to describe mindful mental traits, states, and the cognitive processes through which they are mediated.[42] My use of the term 'the science of mindfulness' focuses on scientific engagement with the mindfulness concept, particularly the use of MBSR and MBIs by psychologists to prevent or treat problematic mental health conditions.

I have recruited the term 'medicalised meditation' to define a new kind of scientific engagement with traditional forms of meditation, an issue described in Chapter 3. Wallace first used the medicalised approach in a peer-reviewed study published in 1970.[43] I have identified four characteristics that distinguished Wallace's work from earlier experimental meditation studies (Figure 2), features also found in the work of Benson and Kabat-Zinn. These scientists had connections to the belief-based meditation methods they investigated. Medicalised experiments focused on meditation's health potential rather than establishing causal mechanisms. Without understanding how meditation worked, it was problematic to develop

[41] Gregory Francis, 'The Psychology of Replication and Replication in Psychology', *Perspectives on Psychological Science*, 7.6 (2012), 585–94 <https://doi.org/10.1177/1745691612459520>. p. 585.
[42] Laura G. Kiken and others, 'From a State to a Trait: Trajectories of State Mindfulness in Meditation during Intervention Predict Changes in Trait Mindfulness', *Personality and Individual Differences*, Dr. Sybil Eysenck Young Researcher Award, 81 (2015), 41–46 <https://doi.org/10.1016/j.paid.2014.12.044>.
[43] Wallace, 'Physiological Effects of Transcendental Meditation'.

the testable hypotheses needed to validate positive mindfulness claims scientifically. As such, the medicalised approach was more suited to developing preliminary understandings rather than robust replication. The author of this thesis provides a more detailed discussion of the background leading to the medicalisation of mindfulness in a peer-reviewed article, 'The Rise of Medicalised Mindfulness During the 1970s and 1980s: The Attempted Convergence of Religion and Science'.[44]

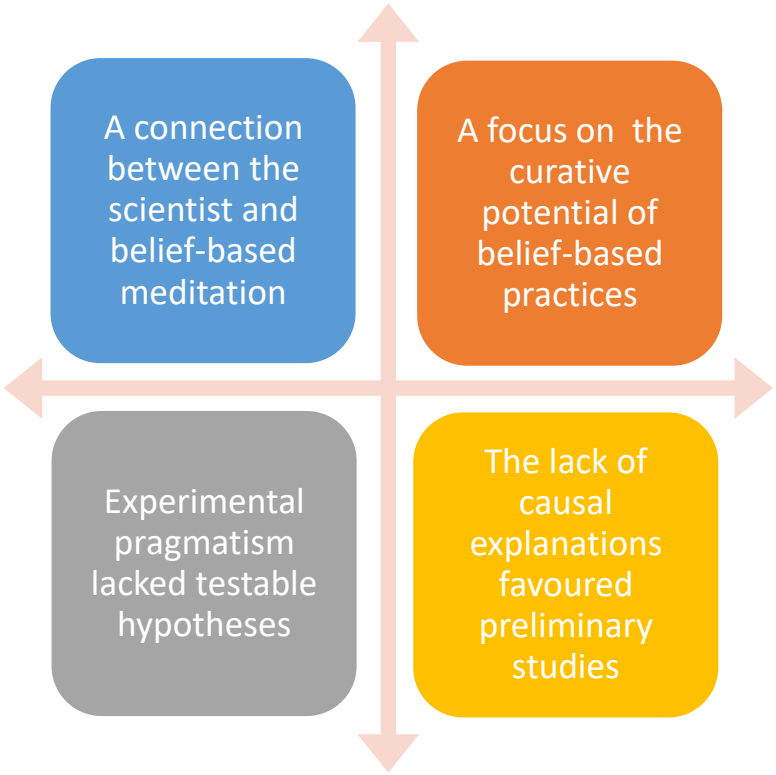

Fig. 2. Four elements of medicalised meditation.

I describe the main medicalised meditation practices, TM, the Relaxation Response (RR) and MBSR in Chapter 3. Because of the strong synergies between these forms, I label medicalised meditation as a movement. As well as being a scientist, Wallace was an adherent

[44] Stephen Morris Gene, 'The Rise of Medicalised Mindfulness During the 1970s and 1980s: The Attempted Convergence of Religion and Science', *Brief Encounters*, 6.1 (2022) <https://doi.org/10.24134/be.v6i1.296>.

and influential member of the TM spiritual tradition in the USA.[45] Wallace's work was paradigmatic, influencing the RR research of Harvard cardiologist Herbert Benson, who in turn impacted Kabat-Zinn's work. Benson collaborated with Wallace on some projects in the early 1970s.[46] Later, Kabat-Zinn thanked Benson for his critical input in the Acknowledgements of his 1982 MBSR paper.[47]

As a new approach, medicalised meditation was a tangent from traditional meditation research published before 1970. A tension between medicalised and traditional approaches developed, and systematic reviews from the traditional perspective identified theoretical and methodological limitations in many medicalised investigations. Kabat-Zinn evolved the medicalised concept further, claiming to have combined or bridged scientific and Buddhist knowledge; I use the term 'medicalised mindfulness' to describe the distinct trajectory of MBSR. Medicalised meditation coexists with traditional scientific approaches; they can be defined as two poles along the spectrum of scientific enquiry.

From a historical perspective, terms such as science, psychology and physiology have changed since the first meditation studies were conducted in the 1930s. For example, the reach and influence of the sub-disciplines of psychology grew dramatically after 1950.[48] For clarity, I describe research and experiments using the terms appearing in the published work of meditation researchers and clinicians. In this thesis, 'scientifically validated' implies the presence of robust evidence for the claims being made. The 'scientific method' denotes a

[45] Daniel Goleman, 'Meditation as Meta-Therapy: Hypotheses toward a Proposed Fifth State of Consciousness', *Journal of Transpersonal Psychology*, 3.1 (1971), 1–25.
[46] Robert Keith Wallace and Herbert Benson, 'The Physiology of Meditation', *Scientific American*, 226.2 (1972), 84–91. Kabat-Zinn thanked Benson for his critical input in the acknowledgement
[47] Jon Kabat-Zinn, 'An Outpatient Program in Behavioral Medicine for Chronic Pain Patients Based on the Practice of Mindfulness Meditation: Theoretical Considerations and Preliminary Results'. p. 46.
[48] Mike Saks, 'Medicine and the Counter Culture', in *Companion to Medicine in the Twentieth Century*, ed. by Roger Cooter and John Pickstone (Abingdon: Routledge, 2003), pp. 113–24.

vigorous, objective process that delivers reliable data and robust findings.[49] However, as will be illustrated throughout the thesis, these terms are far from absolute. They can change according to time, place and the agency of individuals present in the processes of science creation. The same principles apply to the use of the terms 'preliminary' and 'robust'. In this thesis, 'preliminary' refers to early-stage, pilot studies or studies with methodological limitations that present rather than prove claims. By contrast, 'robust' studies are likely to make claims based on replicated experiments that use methodologies offering greater reliability, such as Randomised Controlled Trials (RCTs).

Another term requiring a supporting definition is 'relocation'. Its use, primarily in Chapters 1, 2 and 3, refers to the movement of knowledge to new cultural and disciplinary locations and implies a degree of individual or institutional agency. I have drawn on Kapil Raj's work in using this term.[50] This concept is particularly important to the scientific history of mindfulness. There is evidence that Western scholars and scientists presumed that insights created in non-scientific knowledge systems, such as Hinduism and Buddhism, were easily accessible. The evidence suggests this may have been wildly optimistic, and theories of relocation may need to encompass how knowledge is translated and reconfigured when moving between different ways of knowing. As Fikret Berkes argued in his 2009 study of the intersection between indigenous ways of knowing and science, a co-production of knowledge is likely necessary where knowledge systems intersect: 'Second, scholars have wasted (in my view) too much time and effort on a science versus traditional knowledge debate; we should reframe it instead as a science and traditional knowledge dialogue and partnership.'[51]

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[49] Brian D. Haig, 'An Abductive Theory of Scientific Method', in *Method Matters in Psychology: Essays in Applied Philosophy of Science*, ed. by Brian D. Haig, Studies in Applied Philosophy, Epistemology and Rational Ethics (Cham: Springer International Publishing, 2018), pp. 35–64 <https://doi.org/10.1007/978-3-030-01051-5_3>.

[50] Kapil Raj, 'Beyond Postcolonialism … and Postpositivism: Circulation and the Global History of Science', *Isis*, 104.2 (2013), 337–47 <https://doi.org/10.1086/670951>.

[51] Berkes Fikret, 'Indigenous Ways of Knowing and the Study of Environmental Change.', *Journal of the Royal Society of New Zealand*, 39.4 (2009), 151–56. p. 151.

Most of the published scientific work cited in this thesis was created using the 'normal' process of science creation; typically, scientists undertake experiments as part of their employment as academics or researchers. However, scientific papers are generally required to acknowledge additional support in the process of science creation. Where relevant, I have shared details of external funding or potential conflicts in experimental work. I use 'medico-scientific' as an overarching term to encompass the full spectrum of scientific, clinical and medical activity. For simplicity, the terms religious, belief-based and spiritual are used interchangeably throughout this research to denote traditional knowledge systems and practices. However, I acknowledge that each religious tradition and school referred to in this thesis has its own complex and unique ontological framework.

As a final clarification, I have followed the standard practice of italicising non-English words throughout this thesis. Key Buddhist and Hindu terms have many variants across different languages and contexts, such as *Dharma*, meaning law or rule.[52] In various settings, the additional use of accents, capitalisation and alternative spellings are commonplace; for example, *dharma*, *dhamma* and *Dharmā*. To avoid confusion, I use the common English form of Buddhist and Hindu terms for consistency and simplicity (Dharma). However, in direct quotation, I leave the terminology unchanged.

3. Key Research Questions

Alongside producing a chronicle of the successful proliferation of mindfulness, my research questions highlight a second, more challenging narrative. How did this intervention become highly valued if the scientific evidence supporting its acceptance was contested? Many

[52] Oxford English Dictionary, 'Dharma' (Online) <https://www.oed.com/search/dictionary/?scope=Entries&q=dharma&tl=true> [accessed 30 September 2023].

reliable peer-reviewed scientific investigations confirm these contradictory and critical accounts, particularly after 2015. As yet, there have been no attempts to explain how and why mindfulness, for almost 40 years, was regarded as scientifically validated in some quarters and unproven in others. The objectives of this thesis have been translated into one overarching research question: 'How and why did mindfulness become an important object of scientific interest?' This investigation is necessarily supported by more detailed secondary questions: how did mindfulness acquire and maintain its status as a scientifically proven psychological intervention? What happened when a religious practice rooted in multiple ontologically distinct traditions was relocated into the scientific domain? What are the core tensions between the spiritual origins of the practice and the operational needs of psychological sciences, how have they shaped this history, and in what ways have these tensions contributed to the various problems with mindfulness research (such as a mindfulness paradox)? Which bridging devices are used (if any) to grapple with the ontological conflict between non-positivist Buddhist knowledge systems and Western science?

Well-designed and properly conducted psychological experiments can observe the effects of meditation on participants in a traditional and objective scientific manner. However, the trajectory established by Wallace and followed by others, including Kabat-Zinn, was a departure from the conventional meditation research published between 1938 and 1969. In the spirit of the Counter-culture, medicalised meditation scientists sought to draw belief-based practices and scientific experiments into closer alignment. This issue is a crucial consideration and underpins my research; MBSR was a deviation from traditional scientific investigations of meditation. This account evidences that spiritual practitioners often followed the medicalised model; I use the term 'scientist-practitioner' to identify scientists committed to the meditation method they studied. This concept is explored further in Chapter 3.

The research questions directly address the gaps in our understanding of the scientific history of mindfulness. The boundaries between religious and scientific thought and practice have been altered and tested by the medicalisation of meditation, but the impact of these changes has not been systematically evaluated. Even the more recent critical studies of mindfulness research have not attempted to identify the underlying causes of the mindfulness paradox. One reason for this omission is the reductive nature of psychological enquiry, which tends to stay within disciplinary boundaries. Therefore, fully addressing my research questions requires a transdisciplinary approach, drawing on a range of established HoS methods, constructivist models, critical analyses of psychological research, and insights from different media, cultural studies, religious studies and Buddhist knowledge systems. This thesis focuses primarily on the forms of mindfulness developed to improve health and wellbeing, particularly mental health. However, after 2003, mindfulness migrated into many different disciplines, which has also contributed to our current understanding. The foundation of this thesis is the peer-reviewed scientific record. However, establishing what traditional mindfulness was and the mechanisms supporting its relocation requires attention to non-scientific sources. In addition, describing the growth and acceptance of medicalised mindfulness also involves attention to socio-cultural influences, including the medical Counter-culture. The wider acceptance of mindfulness was supported by non-scientific publications such as self-help books, some written by meditation scientists such as Kabat-Zinn.[53] Since 2003, enthusiastic media support for many claims made in early-stage mindfulness experiments has fuelled public interest, and mindfulness now produces more published peer-reviewed papers than other well-established psychological treatments such as CBT.[54] (Figure 3) This entanglement of science,

[53] Kabat-Zinn has published many books advocating the widespread use of mindfulness in society, for one of his earliest successes see, Jon Kabat-Zinn, *Full Catastrophe Living: Using the Wisdom of Your Body and Mind to Face Stress, Pain, and Illness* (New York, N.Y.: Delacorte Press, 1990).
[54] Elsevier, Document Search 'CBT', 'meditation', and 'mindfulness', Scopus, 2023. <https://www.scopus.com> [accessed 28 September 2023].

media and health policy offers insights into processes of science creation at the intersections of scientific and non-scientific knowledge.

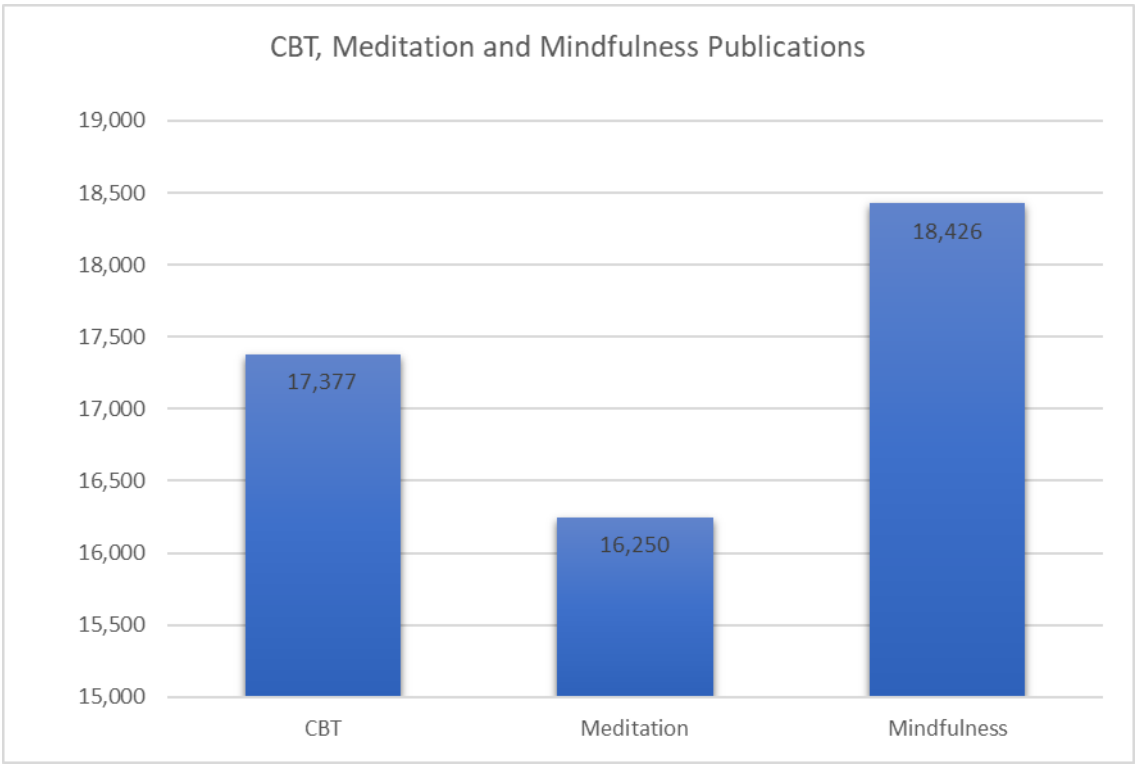

Fig. 3. Scopus entries indexed between 2000 and 2020 with the terms 'CBT', 'meditation', or 'mindfulness' in the title, abstract or keywords.

As well as a scientific history in its own right, this thesis contributes to our understanding of other scholarly areas. The present scientific location of mindfulness has depended on Kabat-Zinn's claims about traditional meditation knowledge. However, the peer-reviewed literature features little scientific evidence to support these claims. Limitations in our understanding have been central to the scientific trajectory of mindfulness. Although MBSR was developed when Western attitudes to the value of traditional knowledge systems may have been very different, claims made in the 1970s and 1980s about the relationship between science and belief continue to be influential. I argue in Chapter 1 that medicalised mindfulness is an example of how Western scientists used subjective understandings of

traditional knowledge to create theoretically incomplete translations of important human technologies. This phenomenon of Western 'outsider' perspectives claiming 'insider' knowledge can be observed in the relocation of other technologies, such as acupuncture.[55]

Claims made by Kabat-Zinn and others about 'Buddhist' meditation typically failed to recognise the ontological differences between Buddhist schools. The trope that mindfulness is an aggregation of 'Buddhist' methods has preserved uncertainty in mindfulness research and Western understanding of Buddhist knowledge. In scholarly literature, the unwitting maintenance of misunderstandings about 'Buddhism' suggests a quasi-colonial attitude towards non-scientific traditions and their practices.[56] Kabat-Zinn originally described mindfulness as pan-spiritual in his earliest MBSR studies, moving more toward a pan-Buddhist model later. For clarity and simplicity in this thesis, Kabat-Zinn's rationale is described as pan-Buddhist or Buddhist.

The complex relationship between belief and science has been a major factor in the scientific trajectory of mindfulness. The work of Thomas signposts the concept of the scientist-practitioner and the potential for bias in meditation research, particularly where scientists encounter incongruities between their religious and scientific convictions.[57] However, it seems likely that this uncertainty, if present, is likely mediated by socio-cultural forces. Although scientists are encouraged to reveal potential conflicts of interest in published papers, disclosing religious affiliations in medicalised meditation research is rare.

[55] Roberta Bivins, 'The Needle and the Lancet: Acupuncture in Britain, 1683–2000', *Acupuncture in Medicine*, 19.1 (2001), 2–14 <https://doi.org/10.1136/aim.19.1.2>.
[56] Steven Stanley, 'Mindfulness: Towards A Critical Relational Perspective', *Social and Personality Psychology Compass*, 6.9 (2012), 631–41 <https://doi.org/10.1111/j.1751-9004.2012.00454.x>.
[57] Thomas, 'Beyond Conflict and Complementarity Science and Religion in Contemporary India'.

4. The Mindfulness Paradox

A central theme in mindfulness research is the presence of two conflicting views: the medicalised paradigm that produces pragmatic claims and the traditional scientific approach that calls for greater methodological reliability. In many ways, the divisions between these two elements are opaque, with many individuals having a foot in both camps and shifting between positions. Problems with the science that supported claims for medicalised meditation were identified in the 1970s. However, despite regular criticism, the amount of early-stage research making positive claims continued to grow, particularly after 2003, and methodological limitations in research became commonplace. Still, it is not easy to understand how and why. The mindfulness paradox was also sustained by scientists who maintained the middle ground, claiming that mindfulness research was promising but not proven, suggesting a 'business as usual' mindset; that more research would lead to more reliable understanding. For example, in the 2003 analysis 'Mindfulness Training as a Clinical Intervention: A Conceptual and Empirical Review', Ruth Baer recognised mindfulness's potential but stressed the need for better-quality experiments.[58] Even though scientific meditation research began in the 1930s and mindfulness studies first appeared in the 1970s, she argued:

> Although the current empirical literature includes many methodological flaws, findings suggest that mindfulness-based interventions may be helpful in treating several disorders. Methodologically sound investigations are recommended in order to clarify the utility of these interventions.[59]

Glen Xiong and Murali Doraiswamy also highlighted the preliminary nature of mindfulness research in 2009: 'However, the enthusiasm must be balanced by the inconsistency and

[58] Ruth A. Baer, 'Mindfulness Training as a Clinical Intervention: A Conceptual and Empirical Review.', *Clinical Psychology: Science and Practice*, 10.2 (2003), 125–43 <https://doi.org/10.1093/clipsy.bpg015>.
[59] Baer, 'Mindfulness Training as a Clinical Intervention: A Conceptual and Empirical Review.' p. 125.

preliminary nature of existing studies.'[60] The puzzle is that trained professional scientists knew what the scientific method was and the importance of robust research methodologies. Kabat-Zinn made explicit claims about the congruence between Buddhist knowledge and science; this idea was influential in developing MBSR and, thus, underpinned the medicalised mindfulness paradigm. Many scientists followed the medicalised trajectory without discussing the role of Buddhist thought and practice in mindfulness. As such, the explicit and inferred influence of belief-based knowledge in experimental studies continued.

Kabat-Zinn's presentation of MBSR as a new hybrid version of mindfulness consistent with Buddhism and science is central to understanding the paradox. However, the absence of scientific explanations of how this relocation was achieved and the operational components of the original practices created an almost impenetrable barrier to scholarly understanding of the rationale of MBSR. Therefore, Chapter 1 establishes a platform to answer three of the secondary research questions: what are the core tensions between the spiritual origins of the practice and the operational needs of psychological sciences, how have they shaped this history, and in what ways have these tensions contributed to the various problems with mindfulness research (such as the paradox)? Because MBSR and MBIs are still major objects of study and influential in health care, wellbeing and social policy, there is a pressing need for a clearer understanding of the scientific history. In particular, to unravel the paradox and deliver an authoritative scientific history chronicling what is known about mindfulness.

[60] Glen L. Xiong and P. Murali Doraiswamy, 'Does Meditation Enhance Cognition and Brain Plasticity?', in *Annals of the New York Academy of Sciences* (Blackwell Publishing Inc., 2009), MCLXXII, 63–69 <https://doi.org/10.1196/annals.1393.002>. p. 63.

5. From Paradox to Crisis: Mindfulness Under Review

Until 2015, critical scientific voices received little attention among mindfulness stakeholders, including the media and social policy agents. An optimistic tone was a factor in the wider presumption of mindfulness's reliability and widespread popularity. In 2015, influential meditation scientists Richard Davidson and Alfred Kaszniak were very upbeat about the future of medicalised mindfulness despite identifying systematic flaws in research: 'With the incorporation of some of the conceptual and methodological desiderata we showcase above, we anticipate a vibrant and productive period for scientific research on meditation in the future.'[61] However, 2015 was the high water mark in the scientific confidence in mindfulness. Even the positive review of Davidson and Kaszniak detailed various methodological and conceptual problems. As this decade progressed, criticisms of the claims made for mindfulness's benefits grew stronger. In 2017, David Creswell challenged the scientific evidence that supported the use of mindfulness in schools.[62] In 2018, Nicholas Van Dam and others published a major mindfulness and meditation research review. The paper: 'Mind the Hype: A Critical Evaluation and Prescriptive Agenda for Research on Mindfulness and Meditation' (MtH) targeted both the implications of poor mindfulness research and its communication as scientifically reliable:

> Misinformation and poor methodology associated with past studies of mindfulness may lead public consumers to be harmed, misled, and disappointed. Addressing such concerns, the present article discusses the difficulties of defining mindfulness, delineates the proper scope of research into mindfulness practices, and explicates crucial methodological issues for interpreting results from investigations of mindfulness. [63]

[61] Richard J. Davidson and Alfred W. Kaszniak, 'Conceptual and Methodological Issues in Research on Mindfulness and Meditation', *American Psychologist*, 70.7 (2015), 581–92 <https://doi.org/10.1037/a0039512>. p. 509.
[62] J. David Creswell, 'Mindfulness Interventions', *Annual Review of Psychology*, 68 (2017), 491–516 <https://doi.org/10.1146/annurev-psych-042716-051139>. p. 509.
[63] Van Dam and others. p. 36.

This study was so influential that a more critical attitude toward mindfulness can be seen in some peer-reviewed papers from this point forward. The co-authors were a prestigious international group from different disciplines. Along with the lead author, psychologist Van Dam, many team members were experts in their field, such as the neuroscientist Kieran Fox and the cognitive scientist Clifford Sauron. The concept for the paper dates back to 2014, illustrating the enduring concerns about meditation research: 'This article grew out of a series of conferences and workshops generously funded by the Mind and Life Institute.'[64]

Van Dam and others argued that mindfulness experiments were producing enthusiastic claims, but very few of which could lead to effective clinical treatments: 'The term mindfulness has a plethora of meanings; a reflection of its incredible popularity alongside some preliminary support, considerable misinformation and misunderstanding, as well as a general lack of methodologically rigorous research.'[65] Two other eminent meditation scientists, Davidson and Cortland Dahl, added their weight to the criticisms made by Van Dam and others in a published response.[66] In 2020, Miguel Farias and others argued that mindfulness could lead to unwanted adverse effects (UAE) in practitioners.[67] The concern that mindfulness research could result in consumers being harmed indicates that the mindfulness paradox had then become a crisis.

[64] Van Dam and others. p. 52.
[65] Van Dam and others. p. 2.
[66] Richard J Davidson and Cortland J Dahl, 'Outstanding Challenges in Scientific Research on Mindfulness and Meditation.', *Perspectives on Psychological Science : A Journal of the Association for Psychological Science*, 13.1 (2018), 62–65 <https://doi.org/10.1177/1745691617718358>. p. 1.
[67] M. Farias and others, 'Adverse Events in Meditation Practices and Meditation-based Therapies: A Systematic Review', *Acta Psychiatrica Scandinavica*, 2020, acps.13225-acps.13225 <https://doi.org/10.1111/acps.13225>.

6. Scope and Sources

Mindfulness has become a complex global phenomenon. Therefore, clear parameters are necessary to create a coherent account that covers several decades and brings together knowledge from different disciplines. In this section, I describe this history's temporal boundaries and rationale. I also explain the places and people selected to underpin my narratives. As a study of scientific engagement, this thesis does not contain an account of religious mindfulness practices except to evaluate claims made for the origins of MBSR. However, to analyse how mindfulness's medicalised rationale originated, a pre-mindfulness history of the science of meditation is provided in Chapter 2. I begin the historical account with William Grey Walter's 1938 experiment, constructing a narrative that ends in 2020, a time frame of 82 years.[68] For completeness, a postscript in the Meta-conclusions also includes more recent sources. In this history, I have cited many of the most influential studies linked to the development and proliferation of mindfulness. I have established an account that consists of the successes of mindfulness and those voices, often less well known, that challenged the claims made for its promotion as a health intervention or panacea. In some places, important innovations linked to meditation are also considered, such as the creation of Zen Psychotherapy.[69]

One of the prerequisites of evaluating a human technology relocated from belief-based knowledge systems to scientific domains is to explain how this transition took place. Accounts from the humanities describe Buddhism's migration West in the 20th century and relevant

[68] Walter. p. 373.

[69] Paul Carus attracted the Zen practitioner D. T. Suzuki to his Religion of Science (RoS) philosophy that claimed a universal truth was being accessed by science and Buddhism. Suzuki, together with Erich Fromm, created Zen Psychotherapy at the end of the 1950s. By the mid-1970s, mindfulness meditation was being used as psychotherapy. For more information on the RoS, see Donald Harvey Meyer, 'Paul Carus and the Religion of Science', *American Quarterly*, 14.4 (1962), 597 <https://doi.org/10.2307/2710135>. Details of Zen Psychotherapy can be found in Erich Fromm, *Psychoanalysis and Zen Buddhism* (New York: Open Road Media, 2013). For early accounts of mindfulness as therapy, see Gary Deatherage.

intersections between the spiritual and the scientific. Robert Sharf explained reforms to Buddhist traditions that supported the creation of Zen Psychotherapy by Fromm and Suzuki.[70] Fromm's reflective account also provides a valuable understanding of early attempts to combine Buddhism and psychology in the late 1950s.[71] The broader social conditions supporting the acceptance of holistic medical traditions into the medico-scientific realm after 1960 have been described by both Mike Saks and Mathew Thomson.[72] Anne Harrington and John Dunne explored how mindfulness became therapy, providing important background information about the relationship between TM, the RR and MBSR.[73] Religious studies scholars have also analysed the claims of ontological congruence between psychology and spiritual knowledge. Sharf illustrated the limitations of generalised claims of symmetry between MBSR and Buddhist traditions.[74] Richard King followed this theme when writing about the location of Buddhist concepts in Western society.[75] The non-scientific accounts of Kabat-Zinn offer important insights into the scientific history of mindfulness.[76] Although no scientific explanation exists of how MBSR bridged Buddhist theory and practice with science, Kabat-Zinn has described, in peer-reviewed religious studies literature, his approach and motivation behind the relocation of mindfulness and its initial trajectory as MBSR. Published in 2011, 'Some Reflections on the Origins of MBSR, Skillful Means, and the Trouble with Maps' feature in *Contemporary Buddhism*, Kabat-Zinn attempted to make sense of the claimed

[70] Robert Sharf, 'The Zen of Japanese Nationalism', *History of Religions*, 33.1 (1993), 1–43 <https://doi.org/10.1086/463354>.
[71] Fromm, *Psychoanalysis and Zen Buddhism*.
[72] Mike Saks, 'Medicine and the Counter Culture', in *Companion to Medicine in the Twentieth Century*, ed. by Roger Cooter and John Pickstone (Abingdon: Routledge, 2003), pp. 113–24. See also Mathew Thomson, *Psychological Subjects : Identity, Culture, and Health in Twentieth-Century Britain* (Oxford: Oxford University Press, 2006).
[73] Anne Harrington and John D. Dunne, 'When Mindfulness Is Therapy', *American Psychologist*, 70.7 (2015), 621–31 <https://doi.org/10.1037/a0039460>.
[74] Robert H. Sharf, 'Is Mindfulness Buddhist? (And Why It Matters)', *Transcultural Psychiatry*, 52.4 (2015), 470–84 <https://doi.org/10.1177/1363461514557561>.
[75] Richard E. King, 'Meditation and the Modern Encounter between Asia and the West', in *The Oxford Handbook of Meditation*, ed. by Miguel Farias, David Brazier, and Mansur Lalljee (Oxford University Press, 2021), p. 0 <https://doi.org/10.1093/oxfordhb/9780198808640.013.2>.
[76] Kabat-Zinn, 'Some Reflections on the Origins of MBSR, Skillful Means, and the Trouble with Maps'.

contradictions and misunderstandings around his appropriation of traditional knowledge. Because of the arguments made in this article and his other writings, a transdisciplinary approach able to describe Buddhist thought and practices from insider perspectives (on its own terms) is necessary. The presumed relationship between Buddhist meditation and mindfulness has been central to the MBSR paradigm and, therefore, the scientific trajectory of mindfulness.[77]

The investigation and integration of mindfulness with science was, and has remained, a transnational project; how could the relocation of ancient Buddhist and Hindu spiritual practices to the West be anything else? However, geographical boundaries have been much harder to establish than temporal limits in this project. Throughout this thesis, I have treated the global research community as a singular entity. Between 1938 and 1969, many nations contributed to the scholarly and scientific study of meditation, with India and Japan particularly prominent.[78] A bibliography of meditation research published by Beverly Timmons and Joe Kamiya in 1970 confirms the depth and breadth of this international engagement. However, the enthusiastic reception to Wallace's 1970 paper led to significant growth in meditation research, particularly in the USA and the UK. Publications from scientists working in these countries dominated for the next three decades. For example, Wallace, Benson and Kabat-Zinn were all based in the USA. The publication of the successful MBCT trial in 2000 was a landmark in mindfulness experiments and reinstated the international dimension of mindfulness research.[79] The positive reaction to this work encouraged more international study, although scientific output from the USA and UK continued to dominate mindfulness research

[77] Dalai Lama and Jinpa Thubten, *Science and Philosophy in the Indian Buddhist Classics, The Physical World* (Summerville MA: Wisdom Publications, 2017), VOLUME 1, 528 <https://doi.org/10.1128/AAC.03728-14>.
[78] For details of meditation research published before 1970, see Beverly Timmons and Joe Kamiya, 'The Psychology and Physiology of Meditation and Related Phenomena: A Bibliography', *The Journal of Transpersonal Psychology*, 2, (no. 1).41. (1970).
[79] Teasdale and others.

and practice. Ironically, mindfulness is now being exported from the West back into Asia, both as a health intervention and as an object of psychological research.[80]

This scientific history of mindfulness considers the wider reception of research findings and those stakeholders that influenced science creation processes. While scientific research is international, its reception varies from nation to nation. Therefore, this thesis evaluates mindfulness research in general, but it introduces a distinctly British tone by considering its relationship with society, largely from a domestic (UK) perspective after 2000. The integration of mindfulness within the UK's health and social policy is discussed in Chapters 6 and 7. UK institutions that offered early support for MBCT included the National Institute of Clinical Excellence (NICE) (now known as the National Institute for Health and Care Excellence) and the National Health Service (NHS).[81] In 2015, the Mindfulness All-Party Parliamentary Group (MAPPG), a Westminster cross-party alliance, lent enthusiastic political support for a significant increase in mindfulness research and practice.[82] The print media was also a major communicator of positive preliminary research findings. In their 2018 critical mindfulness and meditation research review, Van Dam and others found a strong correlation between the global growth in print media articles and published mindfulness studies. (Figure 4)[83]

There are some similarities in public/social policy engagement with mindfulness between the USA and the UK. However, the acceptance and integration of mindfulness are not uniform across all societies. This thesis focuses on the location of mindfulness in the UK after 2000; more research is required to understand the role of mindfulness in other nations.

[80] Nishit Kumar Sinha, Pankaj Kumar, and Pushpendra Priyadarshi, 'Relating Mindfulness to Financial Well-Being through Materialism: Evidence from India', *International Journal of Bank Marketing*, 39.5 (2021), 834–55 <https://doi.org/10.1108/IJBM-07-2020-0375>.
[81] Crane and Kuyken,
[82] MAPPG.
[83] Van Dam and others. p. 36.

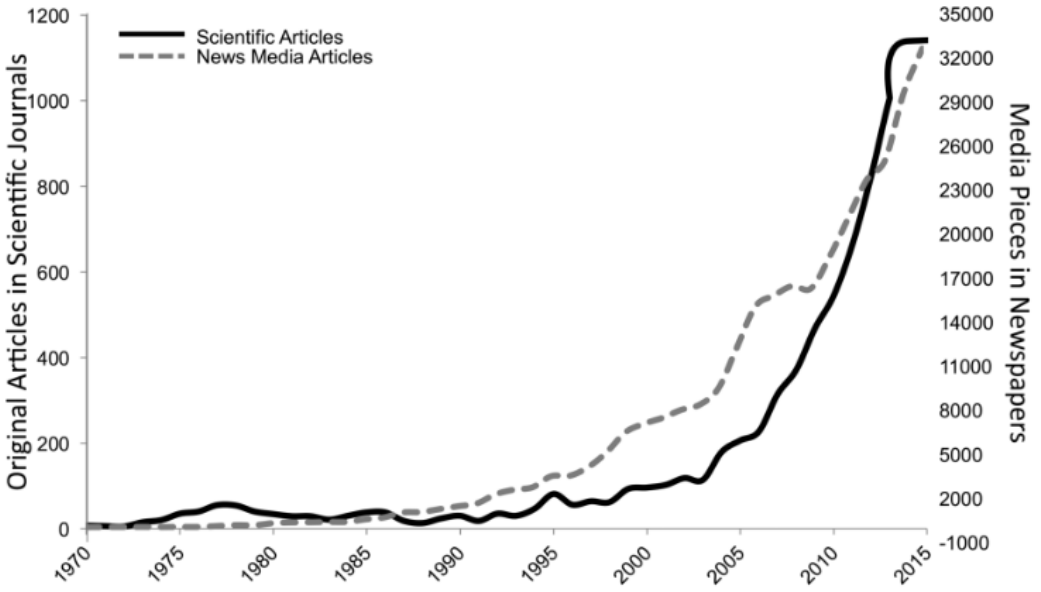

Fig. 1. Scientific and news media articles on mindfulness and/or meditation by year from 1970 to 2015. Empirical scientific articles (black line) with the term *mindfulness* or *meditation* in the abstract, title, or keywords, published between 1970 and 2015 were searched using Scopus. Media pieces (dashed gray line) with the term *mindfulness* or *meditation*, published in newspapers, using a similarity filter to minimize double-counting, published between 1970 and 2015 were searched using LexisNexis.

Fig. 4. A graph (Fig. 1) from the 2018 study by Van Dam and others illustrates the strong correlation between published peer-reviewed papers and print media articles linked to mindfulness and meditation.[84]

The rationale of this project is to describe the scientific history utilising a case study methodology, analysing the most influential peer-reviewed papers to describe the progression of mindfulness. By definition, scientific papers that are widely cited have a significant impact. The studies featured in this thesis include many with the most citations from the last seven decades. These accounts are the centrepiece of this research project, demonstrating the growth in scientific engagement. After 2000, the number of mindfulness publications was so great that strategic reviews became essential to establishing an overview of research and practice, although case studies of individual peer-reviewed papers remain important throughout. I also seek to explore the lesser-known, contested narratives that challenge accounts of mindfulness's

[84] Van Dam and others. p. 36.

success and its presumed promise. Scientific reviews document the challenges to well-received preliminary experiments, but a more investigative approach is needed to uncover how conflicting views of mindfulness research were established. A greater degree of critical judgment is necessary to create a coherent narrative in these areas. Some of the sources used exist at the boundaries between science and other ways of knowing and lack any scientific precedent, such as the attempts to establish mechanisms of mindfulness by Shapiro and others in 2006.[85] As discussed in Chapter 6, Shapiro and others attempted to reverse engineer a theoretical framework for mindfulness by comparing Kabat-Zinn's claims with Buddhist knowledge.

The HoS has many examples of studies exploring the complex nature of science creation. My starting point for thinking about possible theoretical and methodological support for this thesis came from Steven Shapin's 'Phrenological Knowledge and the Social Structure of Early Nineteenth-Century Edinburgh'.[86] Although published almost 50 years ago, Shapin illustrated that a scientific history can attend to the social location of science and its actors. Further, historians can consider those actors and their acts in their original settings to offer enriched insights. In describing the progress of phrenology in Edinburgh, Shapin used sources for their documentary and explanatory value, illustrating how social forces, such as belief and economics, influenced science creation. He also stressed the need to understand knowledge on its own terms, in its original contexts, rejecting contemporary imaginaries uncoupled from their original socio-cultural context:

> Much history which we accept as 'good' wins our applause by demonstrating that the history of, for example, science cannot be explained without attention to religious thought and economic facts. While one may come to identify, through one's historical work, intellectual sub-cultures or other separable spheres of activity, one may also miss

[85] Shauna L Shapiro and others, 'Mechanisms of Mindfulness.', *Journal of Clinical Psychology*, 62.3 (2006), 373–86 <https://doi.org/10.1002/jclp.20237>.
[86] Shapin, 'Phrenological Knowledge and the Social Structure of Early Nineteenth-Century Edinburgh'. p. 221.

> the mark by uncritically accepting the current location of their boundaries or by reifying academic sub-disciplines.[87]

These insights have encouraged me to explore the evidential basis of mindfulness's relocation, its claimed congruence with Buddhist knowledge, and the influence such claims have had on the science of mindfulness. By its very nature, published scientific literature is central to this history, but understanding how and why medicalised meditation developed requires engagement with a wider range of sources.

The social context in which the growth of meditation research took place from the 1950s becomes clearer through interdisciplinary investigation. Personal accounts, media reports and statistical data supplement attention to religious studies and psychological and philosophical literature. The idea that mindfulness could bridge Eastern knowledge traditions and psychology is rooted in values present in the 1950s Counter-culture.[88] To explain the link between socio-cultural changes in some Western industrialised societies and the development of MBSR, media articles supplement journal papers and other historical accounts. For example, although not yet encountered in the peer-reviewed literature, this thesis details scientific experiments similar to Wallace's original TM research from 1970, conducted in India and originally published in The Times in 1969.[89] The presence of such an investigation offers new insights into the scientific trajectory of meditation and the influence of the TM organisation on the direction of mainstream science creation. The role of religions and religious affiliations in the agency of scientists during the 1970s and 1980s has also been informed by personal accounts, newspaper reports and self-help books.

[87] Shapin, 'Phrenological Knowledge and the Social Structure of Early Nineteenth-Century Edinburgh'. p. 221.
[88] Fromm, 'Psychoanalysis and Zen Buddhism'.
[89] Peter Hazelhurst, 'Yogis' Claims Are Put to the Test', *The Times* (London, 19 May 1969), p. 8.

The development of MBCT during the 1990s is the most significant landmark in the growth of MBIs.[90] The presence of scientists from the UK's prestigious Medical Research Council Cognition and Brain Sciences Unit (MRCCBSU) at Cambridge in MBCT research strengthened the scientific credentials of medicalised mindfulness. Although MBCT represents a small proportion of the total mindfulness research output, its influence has been great; MBCT has been mindfulness's scientific flagship since 2000, representing, for some, an overarching proof of the mindfulness concept. The dramatic growth in interest in mindfulness after 2002 is reflected in the scientific literature and print media and is likely related to the positive reception of MBCT by the scientific mainstream. By 2011, mindfulness had become so popular that advocates published an edited collection of essays that claimed a *Mindfulness Revolution* was taking place.[91] Evidence shows that a co-dependent relationship between science, the media, and other mindfulness stakeholders has developed. After 2013, sources illustrating the growing support for mindfulness from health and social policy became more prominent. For example, the 2014 MAPPG report, *Mindful Nation,* linked mindfulness to the UK's future prosperity through the concept of 'mental capital'.[92] Scientific engagement with mindfulness became so widespread that peer-reviewed papers and media articles provide comprehensive insights into the mindfulness paradigm from many different perspectives in addition to health and wellbeing.

7. Methodology, Theoretical Frameworks and Impact

I define my research as transdisciplinary, loosely aligned to the definition of Bernard Choi and Anita Pak in 2006: 'Transdisciplinarity integrates the natural, social and health

[90] Teasdale and others.
[91] Barry Boyce.
[92] MAPPG. p. 6.

sciences in a humanities context, and transcends their traditional boundaries.'[93] While I consider the medico-scientific history of mindfulness in a humanities context, I also attend to the world views of Buddhist traditions. In Chapter 1, the impact of Buddhist knowledge on the development of MBSR and MBIs is discussed from sociological, religious studies and Buddhist perspectives, an approach necessitated by Kabat-Zinn's use of Buddhist concepts to explain mindfulness. In a 2011 paper published in *Contemporary Buddhism*, he made claims about MBIs that can only be approached by engaging with Buddhist knowledge; for example, his use of Buddhist terms abstract to most Western scientists: 'Since all mindfulness-based interventions are based on relatively intensive training in awareness in the context of a universal dharma framework (and as I have been asserting here, not different in any essential way from Buddhadharma).'[94]

Many of Kabat-Zinn's claims about the relationship between Buddhism and MBSR are controversial; Chapter 1 illustrates widespread scholarly challenges from the perspectives of religious studies.[95] However, the influence of Buddhism on the development of MBSR from a scientific viewpoint is an under-researched area, possibly because its investigation requires a rare skill set. Alongside training in neuropsychology (specialising in meditation) and the HoS, I have also received formal instruction in different Buddhist schools over the last 25 years, including teachings in the theoretical frameworks of meditation methods and Tsema, a Himalayan logic system linked to the functions of mind and perception.

There is no precedent in the scientific literature of how to bridge Buddhist and scientific knowledge systematically; Kabat-Zinn did not provide a clear rationale of what was bridged or

[93] Bernard C. K. Choi and Anita W. P. Pak, 'Multidisciplinarity, Interdisciplinarity and Transdisciplinarity in Health Research, Services, Education and Policy: 1. Definitions, Objectives, and Evidence of Effectiveness', *Clinical and Investigative Medicine. Medecine Clinique Et Experimentale*, 29.6 (2006), 351–64.
[94] Kabat-Zinn, 'Some Reflections on the Origins of MBSR, Skillful Means, and the Trouble with Maps'. p. 296.
[95] For example, Robert H. Sharf, 'Is Mindfulness Buddhist? (And Why It Matters)', *Transcultural Psychiatry*, 52.4 (2015), 470–84 <https://doi.org/10.1177/1363461514557561>.

how a potential ontological conflict was avoided.[96] As concerns about limitations in the theoretical frameworks of mindfulness have grown, there has been an increase in attempts to establish the mechanisms on which mindfulness rests.[97] Therefore, understanding what the 'bridge' is and how it impacted the trajectory of mindfulness is a priority in my research. I am not the first scientist to point out the complexity of integrating science and Buddhism in MBSR. For example, Susanne Rösner and others published concerns about the impact of ontological uncertainty on mindfulness research in 2015 in reviewing the use of mindfulness in substance abuse.[98] Firstly, they confirmed the lack of a stable definition: 'Even though, to date, no consensus has been reached on how to define mindfulness, Bishop 2004`s two-factor conceptualisation is often applied as an operational definition in research.'[99] Secondly, they contend that merging Buddhist knowledge with science is far from simple:

> Critical issues have been raised about mixing Buddhist elements with current psychological theories in modern mindfulness-based interventions (MBI) and the resulting consequences for practitioners` aims and attitudes and the underlying psychological mechanisms. Some authors considered that influences of ancient Buddhist philosophy are only marginally acknowledged in modern MBIs and even identified misunderstandings of the concept of mindfulness in some modern ways of practising mindfulness.[100]

Part of this thesis's unique contribution is the exploration of Kabat-Zinn's claims from scientific and non-scientific perspectives, challenging established Western imaginaries of Buddhist knowledge where they intersect with science.

[96] For a general explanation of the bridging hypothesis see Kabat-Zinn, 'Some Reflections on the Origins of MBSR, Skillful Means, and the Trouble with Maps'.
[97] For a discussion of the major fragmentation in the theoretical framework, see Nilsson and Kazemi.
[98] Susanne Rösner, Reinhard Willutzki, and Aleksandra Zgierska, 'Mindfulness-Based Interventions for Substance Use Disorders', *Cochrane Database of Systematic Reviews*, 2015.6 (2015), CD011723 <https://doi.org/10.1002/14651858.CD011723>[accessed online 21/10/23]. p. 2.
[99] Rösner and others. p. 3.
[100] Rösner and others. p. 3.

There are HoS investigations illustrating the effectiveness of interdisciplinary and transdisciplinary approaches in understanding science creation at the boundaries of knowledge systems, such as phrenology, mesmerism, and acupuncture. Some of these accounts have offered methodological and theoretical models on which to base my research. The aforementioned work of Shapin's linked to the Edinburgh phrenology debate, a battle for scientific orthodoxy in nineteenth-century Scotland, illustrates the value of social constructivism in writing a scientific history.[101] Constructivist approaches often challenge 'Whig history', the steady movement of science towards an ever-greater understanding of nature.[102] Mindfulness reflects a convergence between ancient meditation methods and experimental science; the current crisis in research is evidence that the progression of science is not always smooth and does not necessarily lead to more reliable insights. These observations illustrate that the 'scientific method' can be part of a wider interpretive process in science creation. Therefore, this account will adopt a constructivist approach to explore how mindfulness was relocated and embedded in scientific settings.

Alison Winter's histories of mesmerism illustrate how challenges to medico-scientific paradigms can be researched.[103] Mindfulness was initially a 'fringe' human technology like phrenology and mesmerism, but with crucial differences. Phrenology and mesmerism ultimately failed in their attempts for scientific acceptance; they were secular, originated in the West and were thus culturally relevant to sections of Western society. Conversely, mindfulness emerged in the West from a movement committed to medicalising Eastern spiritual methods. It may also be relevant that Kabat-Zinn, Wallace and other influential scientist-practitioners had explicit connections to the spiritual practices they advocated. An example of the

[101] Shapin, 'Phrenological Knowledge and the Social Structure of Early Nineteenth-Century Edinburgh'.
[102] Jan. Golinski, *Making Natural Knowledge : Constructivism and the History of Science* (University of Chicago Press, 2005). p. 4.
[103] Alison Winter, *Mesmerized : Powers of Mind in Victorian Britain* (Chicago: University of Chicago Press, 2000).

engagement of an established non-Western human technology by science is provided by Roberta Bivins.[104]

Bivins's accounts of the relocation of acupuncture to the West illustrate how the tension between Eastern, non-positivist knowledge and science could be described from a HoS perspective.[105] Although acupuncture is not a spiritual practice, it is just as incongruent with science; its underlying theoretical frameworks, in common with Buddhist traditions, do not conform to Western scientific understandings, so they are essentially unobservable and even incommensurable to science.[106] Incommensurability is a concept presented by Thomas Kuhn in his seminal work *The Structure of Scientific Revolutions* and discussed in an Anniversary Edition of the original text.[107] Although the notion of incommensurability has been taken in several different directions, there is a consensus that it reflects a fundamental incongruence between knowledge situated in other paradigms. In the case of meditation, it could mean that scientists from one paradigm, such as psychology, likely view Buddhist meditation from within their own theoretical framework as outsiders unable to engage with the underlying Buddhist worldview. Both acupuncture and meditation have been relocated to Western medico-scientific contexts by translating or reconfiguring the practices to accommodate scientific insights. Acupuncture was translated to a biomedical interpretation, Western Medical Acupuncture (WMA), and Buddhist mindfulness was redefined to MBSR to adapt to the principles of positivism.[108]

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[104] Roberta Bivins, 'The Needle and the Lancet: Acupuncture in Britain, 1683–2000', *Acupuncture in Medicine*, 19.1 (2001), 2–14 <https://doi.org/10.1136/aim.19.1.2>.
[105] Bivins, 'The Needle and the Lancet: Acupuncture in Britain, 1683–2000'.
[106] For a discussion of the extent to which conservative science can attend to conceptually 'alien' concepts, see Xiang Chen, 'Thomas Kuhn's Latest Notion of Incommensurability', *Journal for General Philosophy of Science*, 28.2 (1997), 257–73 <https://doi.org/10.1023/A:1008220212003>.
[107] Thomas S. Kuhn, *The Structure of Scientific Revolutions*, Anniversary Edition (The University of Chicago Press, 2012).
[108] For a definition of WMA, see Adrian White, 'Western Medical Acupuncture: A Definition.', *Acupuncture in Medicine: Journal of the British Medical Acupuncture Society*, 27.1 (2009), 33–35 <https://doi.org/10.1136/aim.2008.000372>.

The definitions of social construction and constructivism are well established.[109] However, nuanced meanings are often linked to disciplinary perspectives. My work follows André Kukla's rationale, describing medicalised mindfulness as the product of internal and external processes.[110] Similarly, by drawing on Jan Golinski's approach, my findings illustrate that the scientific trajectory of mindfulness has also been mediated by non-empirical forces from within science, such as the agency of individual scientists and external processes, including health and social policy.[111]

Despite obvious differences, the work of Shapin, Winter and Bivins offers methodological templates for a constructivist exploration of this scientific history.[112] In common with Bivins, I am explaining the relocation of a health practice from a non-scientific knowledge system.[113] We both describe how science copes with a human technology it does not have the ontology to access. One of Winter's main concerns is establishing orthodoxy, the perception of science as 'proper reasoning'.[114] This same issue appears throughout my research and informs my discussion of what happens when conflicting narratives of 'reliable' science exist. Although my investigation and Shapin's early work have many differences, a sentence from his phrenology investigation resonates with my thinking: 'By attending to the social context of the debate and the functions of ideas in that context one may construct an explanation of why conflict took the course it did.'[115] Throughout this thesis, I will demonstrate how the

[109] Roya Jafari Amineh and Hanieh Davatgari Asl, *Journal of Social Sciences, Literature and Languages Review of Constructivism and Social Constructivism*, JSSLL Journal, 2015, I, 9–16.
[110] André Kukla, *Social Constructivism and the Philosophy of Science* (London: Routledge, 2000).
[111] Golinski. p. 48.
[112] For example, Winter, *Mesmerized : Powers of Mind in Victorian Britain*; Shapin, 'Phrenological Knowledge and the Social Structure of Early Nineteenth-Century Edinburgh'. And Bivins, 'The Needle and the Lancet: Acupuncture in Britain, 1683–2000'.
[113] Bivins, 'The Needle and the Lancet' Acupuncture in Britain, 1683–2000'.
[114] Alison Winter, 'Mesmerism and Popular Culture in Early Victorian England', *History of Science*, 32.3 (1994), 317–43 <https://doi.org/10.1177/007327539403200303>.
[115] Shapin, 'Phrenological Knowledge and the Social Structure of Early Nineteenth-Century Edinburgh'. p. 219.

social context in which science is created, in the form of religious, cultural and political shifts, exerted influence over the trajectory of meditation research.

My study of the relocation of meditation from the spiritual to the scientific domain is also influenced by Sheila Jasanoff's models of knowledge co-production, establishing to what extent Buddhism and psychology were in a collaborative partnership in developing MBSR.[116] Jasanoff's descriptions suggest that a relationship between religious forms of meditation and science created by scientists from belief-based communities should not be surprising: 'Briefly stated, co-production is shorthand for the proposition that the ways in which we know and represent the world (both nature and society) are inseparable from the ways in which we choose to live in it.'[117]

However, there is uncertainty and competing narratives about the relocation of mindfulness. Kabat-Zinn claimed MBSR was a bridge between Buddhism and science, but this co-production model is challenged from religious studies and scientific perspectives. Rather than actual co-production, MBSR may reflect one individual's insights into what co-production might look like. David Livingstone illustrated this point when investigating earlier intersections between religion and science; he argued that 'to understand 'the encounter between science and religion', I submit, will require us to take with greater seriousness the situatedness of both scientific and religious discourses.'[118]

Many of the components presented in this history have been previously observed in isolation, set within disciplinary boundaries. For example, references to the uncertain methodological investigation of MBSR and MBIs can be found in multiple sources cited in this

[116] Sheila Jasanoff, *One. Future Imperfect: Science, Technology, and the Imaginations of Modernity*, *Dreamscapes of Modernity* (University of Chicago Press, 2015), pp. 1–33 <https://www.degruyter.com/document/doi/10.7208/9780226276663-001/html> [accessed 30 July 2021].
[117] Jasanoff. p. 4.
[118] David N. Livingstone, 'A Chapter in the Historical Geography of Darwinism: A Belfast-Edinburgh Case Study', *Scottish Geographical Magazine*, 113.1 (1997), 51–57 <https://doi.org/10.1080/00369229718736990>. p. 56.

thesis. In this context, my unique contribution is twofold. Firstly, I establish a history that joins existing nodes of knowledge into a constructivist account. Secondly, I use a transdisciplinary approach to excavate areas where knowledge is uncertain or missing at the neglected intersections between disciplines. Although I highlight challenges to the dominant narrative that evidence for mindfulness's benefits has been scientifically validated, this thesis is not a critical review. Its major contribution is not the claim that mindfulness research is contested; this has been evident for decades; rather, it seeks to explain how and why paradoxical views were established and maintained over a sustained period. This insight is particularly important because the paradox is not a conceptual battle where one view of science has emerged as dominant, as in the Edinburgh phrenology debate: the conflict in mindfulness research still endures. My research and analysis have also led to controversial conclusions that offer opportunities for further investigation. For example, failing to recognise ontological distinctions in treating knowledge from different Buddhist traditions has profound implications wherever Western scholars claim insider knowledge of traditional or nativist insights. Even more pressing is the social policy agenda to locate mindfulness in UK schools through the concept of 'mental capital' to sustain the UK's economic status over other nations.[119]

Since the 2018 critical review by Van Dam and others, there has been a more cautious approach to claims made in mindfulness research and practice.[120] This shift can be seen in the 2022 review of School-Based Mindfulness Therapy, which, for completeness, is discussed briefly as a postscript to the Meta-conclusions.[121] However, very little attention has been given to explaining how, despite the publication of thirty thousand peer-reviewed mindfulness papers, we still do not know what caused the paradox and how we might resolve it and ensure

[119] This issue is discussed in more detail in Chapter 7, see MAPPG. p. 6.
[120] Van Dam and others.
[121] Jesus Montero-Marin and others, 'School-Based Mindfulness Training in Early Adolescence: What Works, for Whom and How in the MYRIAD Trial?', *Evidence-Based Mental Health*, 25.3 (2022), 117–24 <https://doi.org/10.1136/ebmental-2022-300439>.

similar problems are not repeated. Therefore, this thesis is timely because science and society are asking important questions about the reliability of mindfulness research and practice. By providing an overview of how traditional mindfulness was relocated as MBSR and proliferated into MBIs, I seek to provide a clearer view of the intervention, which will interest scientists, clinicians, teachers and meditation practitioners. Improved understanding will support opportunities to reevaluate research and practice and develop more effective ways of harnessing the health potential of meditation.

From a transdisciplinary perspective, unevidenced claims of MBSR's congruence with science and spiritual concepts will contribute insights to discourses in the HoS, philosophy of science and religious studies. The identification of a medicalised meditation movement is likely to be of value to medical humanities researchers as an example of changing boundaries in health sciences. In addition, the failure of many scientists and scholars to recognise Buddhism as a series of ontologically different knowledge systems indicates a tendency by some Western academics to subordinate rather than understand traditional knowledge. My research seeks to enhance current thinking about the relationship between positivist and traditional thought and practice. Finally, examining the role of scientist-practitioners in the process of science creation raises new questions about the role of bias and agency in scientific experiments.

Chapter 1. The Intersection of Science and Religion: Theoretical and Operational Considerations

1. Introduction

Throughout this chapter, a range of views about the compatibility of religion and science are presented and analysed. Many of these positions reflect the convictions of scholars, scientists and spiritual practitioners. However, detailed consideration of the worldview of different religious traditions illustrates a conceptual conflict with the positivist principles of experimental psychology. For example, Mahayana Buddhism uses philosophical concepts that are alien to science, such as 'emptiness', to understand mind and matter. Jay Garfield's description of Nagarjuna's concept of emptiness illustrates this point: 'The central topic of the text is emptiness-the Buddhist technical term for the lack of independent existence, inherent existence, or essence in things.'[1] This chapter will argue that science holds a conflicting position with Buddhism regarding the value of experiments in establishing the 'independent existence' of phenomena. The purpose of this chapter is not to champion one knowledge system over another but to explore the foundational claim that MBSR presents a fusion of Buddhism with science. The implications of this analysis on the scientific trajectory of mindfulness are also discussed.

Scientists can observe the effects of meditation on participants in any well-conducted experiment. However, Kabat-Zinn contends that mindfulness became a bridge between two distinct knowledge systems: 'With the aim of bridging these two epistemologies of science and dharma, I felt impelled to point out in the early years of MBSR the obvious etymological

[1] Jay L. Garfield, 'Dependent Arising and the Emptiness of Emptiness: Why Did Nāgārjuna Start with Causation?', *Philosophy East and West*, 44.2 (1994), 219–50 <https://doi.org/10.2307/1399593>. p.219.

linkage of the words medicine and meditation and articulate for medical audiences their root meanings.'[2]

Combining two potentially incongruent knowledge systems, such as Buddhism and psychology, raises many problematic questions, not least, how belief and science can be brought together. Key problems in Kabat-Zinn's work are that he did not explain how he relocated traditional forms of mindfulness, what Buddhist practices were adopted, and how causal mechanisms in mindfulness could be understood and scientifically tested. By introducing non-scientific practices into scientific domains without a stable theoretical framework, uncertainty over what mindfulness was and its underlying mechanisms became part of the mindfulness paradigm. Kabat-Zinn and many other scientists overcame this uncertainty by adopting a medicalised approach, evaluating the benefits of mindfulness on health and wellbeing. In the scientific literature, claims that mindfulness brings health benefits are frequently unsupported by testable hypotheses that would allow the experimental findings to be scientifically validated. In 2006, Shapiro and others attempted to 'reverse engineer' a theoretical framework for mindfulness in a widely cited paper, 'Mechanisms of Mindfulness'.[3] Based on Kabat-Zinn's claims and their understanding of Buddhism, the authors developed a tentative model:

> Clearly this model is preliminary, and is merely "a" model, not "the" model. There are numerous other possibilities and pathways that may play a role in this mysterious and complex process. The next step is to develop testable hypotheses that can be empirically examined. From these results, new hypotheses could be developed, and new, more fully elaborated theories derive.[4]

[2] Kabat-Zinn, 'Some Reflections on the Origins of MBSR, Skillful Means, and the Trouble with Maps'. p. 288.
[3] Shapiro and others.
[4] Shapiro and others. p. 385.

Shapiro and Linda Carlson revisited this theoretical problem 11 years later, asking, 'How is mindfulness helpful?':

> It is an attempt to search for common ground on which to build a more precise understanding of the primary mechanisms of action involved in mindfulness practice. After describing our model, we compare and contrast with other putative mechanisms that have emerged in the literature and review studies that have empirically tested components of the model.[5]

Between the publication of the two 'Mechanisms of Mindfulness' papers, many different attempts to explain mindfulness and how it worked were published, but little progress was made. Some scientists developed theoretical explanations linked to specific conditions, as in the 2000 MBCT trial.[6] Unsurprisingly, the proliferation of theoretical frameworks, many lacking testable hypotheses, led to the fragmentation of the mindfulness concept, with dozens of different understandings present in the peer-reviewed literature by 2016.[7]

Religious studies scholars have challenged Kabat-Zinn's explanations of mindfulness's Buddhist provenance. However, no systematic study has attempted to evaluate the bridging hypothesis from a scientific perspective. This chapter will analyse if MBSR is Buddhist and, if so, can be integrated into psychology. These two questions appear central to establishing a stable theoretical understanding of mindfulness and, thus, the successful scientific engagement with Buddhist meditation technologies.

Many scientists, perhaps more than one thousand, have contributed peer-reviewed papers to the corpus of mindfulness research. New scientific paradigms tend to be created by shifts within scientific communities rather than the creation of individual enterprises. However,

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[5] Shauna L. Shapiro and Linda E. Carlson, 'How Is Mindfulness Helpful? Mechanisms of Mindfulness', in *The Art and Science of Mindfulness: Integrating Mindfulness into Psychology and the Helping Professions, 2nd Ed* (Washington, DC, US: American Psychological Association, 2017), pp. 99–112 <https://doi.org/10.1037/0000022-008>.

[6] Teasdale and others.

[7] Nilsson and Kazemi.

Kabat-Zinn's prominence in this chapter is linked to his role as the founder of MBSR and his unevidenced insistence that MBSR is the integration of Buddhist and scientific knowledge. A fascinating secondary aspect of this scientific history is how (and why) so many scientists followed the trajectory of MBSR despite lacking a viable theoretical framework, establishing claims for mindfulness's benefits based on pragmatic methodologies.

Some academic support for discussing how scientists might hold scientific and religious convictions has been informed by Thomas's 2018 paper, which considered the impact of religious beliefs on scientific practices in India.[8] Thomas argued that reducing the motivation of scientists to simple binaries of either a scientist or a spiritual practitioner was limiting:

> Rather, it is important to argue that science and religion are two different modes of existence, and it should not be a surprise to see scientists believing in God, or not believing in God, as there is no natural relationship or conflict between these two categories. This way of looking at science and religion invites us to look at the discourse in a fresh manner, wherein one need not to see conflict or complementarity and treat these categories independently, so that one would not be surprised to see scientists believing in God as if they are not supposed to do that.[9]

Thomas's findings provided a foundation from which to consider the actions of American meditation scientists and offer a heuristic to investigate the bridging hypothesis. If Indian scientists could maintain scientific and religious practices without intellectual conflict, why did Kabat-Zinn need to bridge meditation with science? There are indications that the relocation of mindfulness may highlight a deep-seated duality in Western scientific practice where only one understanding of mindfulness (scientific, religious or a fusion) could be dominant. This idea is not purely a theoretical concern but rests at the heart of the science of meditation. One implication is that Western scientists translate non-scientific knowledge into new forms

[8] Thomas, 'Beyond Conflict and Complementarity Science and Religion in Contemporary India'.
[9] Thomas, 'Beyond Conflict and Complementarity Science and Religion in Contemporary India'. p. 60.

congruent with a scientific form to understand it, thus changing it to an imaginary of its original configuration.

The rules of ontology and epistemology govern the psychological sciences. In 2003, Stephen Yanchar and Jack Hill explained their significance to scientific studies:

> These axioms dictate what entities and processes are taken by scientists to be real—that is, a science's ontology—and how we can generate dependable knowledge regarding those entities and processes—that is, a science's epistemology. These philosophical axioms are crucial to any scientific project, even if they are not made explicit, because what is assumed to be real (and not real) will necessarily dictate the type of research and theories generated.[10]

Possible alterations to these frameworks by combining non-science with science may influence processes of science creation or lead to ontological failure.[11] By ontological failure, I mean creating a treatment based on principles that are unobservable or incommensurable with a scientific worldview. Kabat-Zinn developed MBSR as congruent with religious and scientific knowledge without discussing the ontological implications to science or Buddhism. Further uncertainty was introduced into mindfulness research through Kabat Zinn's reliance on concepts abstract to Western science, such as *Dharma* and *Buddhadharma*.[12] In 2016, David Lewis and Deborah Rozelle explained the use of the meaning of the term *Buddhadharma* and argued why it should not be considered appropriate for medico-scientific domains:

> MBIs have increasingly acquired an alternate identity as a form of Buddhadharma itself, as the essence of Buddhadharma recontextualized for the mainstream of society. We

[10] Stephen C. Yanchar and Jack R. Hill, 'What Is Psychology About? Toward An Explicit Ontology', *Journal of Humanistic Psychology*, 43.1 (2003), 11–32 <https://doi.org/10.1177/0022167802238811>. p. 12.
[11] Pita King, Darrin Hodgetts, and Danilo Silva Guimarães, 'Towards rethinking the primacy of epistemology in psychology: introduction to the special section', *Theory and Psychology*, 31.2 (2021), 153–60.
[12] Kabat-Zinn, 'Some Reflections on the Origins of MBSR, Skillful Means, and the Trouble with Maps'.

> critique the claim that MBIs embody the essence of Buddhadharma. They do not aim at the goals of Buddhadharma and do not engage the vital wisdom that leads there.[13]

How such terms can be understood and applied by scientists and clinicians is unclear, and their use is likely a significant barrier to scientific replication. Further complications in the symmetry between Buddhist knowledge and science emerge in Kabat-Zinn's inconsistent use of these Buddhist terms. For example, the mindfulness researcher Ville Husgafvel contends that Kabat-Zinn's work demonstrates an eclectic presentation of Buddhist ideas: 'Thus, Kabat-Zinn's 'universal dharma understanding' represents a highly selective filtering and adaptation of Buddhist ideas, which seeks a delicate balance between Buddhist insights and scientific/rational thought.'[14]

From these perspectives, unevidenced claims of MBSR's relationship with Buddhist traditions may act as a barrier rather than a bridge to understanding the relocation of mindfulness to psychology. The following sections consider the historical relationship between religion and science, explore the original theoretical frameworks of mindfulness, and the plausibility of MBSR's claimed congruence with pan-religious or pan-Buddhist knowledge. Section 2 introduces scholarly discussions about the relationships between science and religion and more explicit discussions of the importance of place. A consideration of 'scientific Buddhism' (seeing Buddhism as science and scientific) is discussed in Section 3. This analysis is followed in Section 4 by comparisons between Kabat-Zinn's work and earlier Western forms of mindfulness. A discussion of the impact of relocating traditional knowledge to medico-

[13] David J. Lewis and Deborah Rozelle, 'Mindfulness-Based Interventions: Clinical Psychology, Buddhadharma, or Both? A Wisdom Perspective', in *Handbook of Mindfulness: Culture, Context, and Social Engagement*, ed. by Ronald E. Purser, David Forbes, and Adam Burke, Mindfulness in Behavioral Health (Cham: Springer International Publishing, 2016), pp. 243–68 <https://doi.org/10.1007/978-3-319-44019-4_17>. pp. 244–245

[14] Ville Husgafvel, 'The 'Universal Dharma Foundation' of Mindfulness Based Stress Reduction: Non-Duality and Mahayana Buddhist Influences in the Work of Jon Kabat-Zinn.', *Contemporary Buddhism*, 19.2 (2018), 275–326 <https://doi.org/10.1080/14639947.2018.1572329>. p. 316.

scientific domains is presented in Section 5. Section 6 considers the process of relocation. A discussion of the perception of Eastern knowledge by science follows in Section 7. The conclusions are presented in Section 8.

2. Putting 'Science' and 'Religion' in Their 'Place'

In the original trajectory of this research, which investigates disciplinary boundaries, I began with some initial presumptions about the objective nature of the terms 'science' and 'religion'. As a recently qualified neuropsychologist, I also held the notion that I was part of an orthodox community that maintained a common understanding of science and processes of science creation. However, as my research progressed, an underlying theme of this thesis, the mindfulness paradox, illustrated that even within the relatively narrow field of cognitive science, there are multiple ways of deploying the scientific method that are complementary and conflicting. I also observed further fluidity in how definitions of science depended on time and place. For example, meditation research transitioned from traditional scientific values in India and Japan during the 1960s to a more flexible medicalised meditation approach in the USA during the 1970s.[15] The medicalised movement also challenged assumptions about religious practice by altering the boundaries between religion and science. As described in more detail in Chapter 3, in the 1960s, scientists such as Akira Kasamatsu and Tomio Hirai preserved the conceptual separation between psychology and Zen Buddhism by treating both as independent knowledge systems.[16] Two leaders of the medicalised meditation movement, Wallace and Kabat-Zinn, altered understandings of the disciplinary boundary between the spiritual and the

[15] This point is discussed in more detail in the following Chapter, but the 1966 paper produced by Kasamatsu and Hirai is still regarded as of a significantly higher scientific quality compared to many of the medicalised meditation studies produced in the USA in the 1970s. Akira Kasamatsu and Tomio Hirai, 'An Electrocephenolographic Study on the Zen Meditation (Zazen)', *Psychiatry and Clinical Neurosciences*, 20.4 (1966), 315–36 <https://doi.org/10.1111/j.1440-1819.1966.tb02646.x>

[16] Kasamatsu and Tomio, 'An Electrocephenolographic Study on the Zen Meditation (Zazen)',

scientific, appearing to accept that religion and science were ontologically consistent and so could be combined, integrated, or bridged. Based on my research, I argue that the terms science and religion cannot be held to be objective and reliable; their definitions are context-dependent; thus, the boundaries between the disciplines should also be considered relative.

In his study of the history of the relationship between religion and science, Peter Harrison describes the changing definitions of, and the relationship between, science and religion: 'When we look at the past, however, we see that the boundaries of these two domains have been understood very differently and that questions concerning ultimate human meaning were rarely divorced from understandings of the nature of the universe.'[17] Harrison maintains that a conflict between science and religion is a relatively recent construct that emerged in the late 19th century. This thesis confirms that the Western historical tendency to draw matters spiritual and scientific into alignment saw a resurgence in the scientific study of meditation from 1970 onward. Some of the main issues in the critical analysis of Western academic religion-science discourses were explored by Ahmad Hussain Bukhari in 2022.[18] Bukhari found that the contemporary positioning of science and religion was inconsistent and required further development.

> Conflict and reconciliation are two prevailing views concerning this discourse. The conflict thesis is the result of modernity, emphasizing the separation of two domains. Religion has had an established plausibility for centuries; it has been there since the dawn of humanity, and the belief in a grand existence, beyond the domain of the observable, has become a part of the way human beings think and feel. On the other hand, science has an equally ancient beginning, and its proponents believe that logical thinking and empirical observation and testing are the only way to approach the truth. Nevertheless, it has been found that despite an ongoing intellectual debate, a balanced coherence between science and religion still needs to be worked out to meet the civilizational challenges of the present day. [19]

[17] Harrison, Peter. *The Territories of Science and Religion*. (Chicago: University of Chicago Press, 2020), p. 34.
[18] Bukhari, Ahmad Hussain. "*Religion-Science Discourse: A Western Perspective*." Journal of Development and Social Sciences 3, no. 2 (2022): 1162-1170.
[19] Bukhari. p 1162.

Both Harrison and Bukhari signpost the limitations in maintaining disciplinary conflict between science and religion from philosophical and even human perspectives. While drawing support from these insights, this scientific history also looks at the relations between religion and science from an applied point of view, seeking to understand how the boundaries were shaped and modified in creating a science of meditation. I also analyse how these discourses influence the processes of science creation, ultimately evidencing that uncertainty about the relationship between science and belief can profoundly impact the reliability of scientific inquiry.

Further uncertainties are uncovered when considering the relocation of meditation technologies from 'East' to 'West'. A philosophical discussion of the merits of dividing the world through terms like East and West is outside the scope of this thesis. I have used the language presented in the scientific papers used in my research; these generally follow the convention of describing the birthplace of meditation as the East and the centres of its transformation into medicalisation, largely the UK and USA, as the West. Livingstone has contributed to a relevant body of work discussing the importance of 'place' as a conceptual category in the reception of sciences and other knowledge systems.[20] In Sections 6 and 7 below, I illustrate significant differences in how elements of Western psychology were received and practised in Asia and how traditional meditation was understood and treated in the USA and UK. In *Putting Science in Its Place: Geographies of Scientific Knowledge*, Livingstone highlights the role of geography in establishing scientific thought and practice:

> Darwinism meant different things in Russia and Canada; it meant different things in Belfast and Edinburgh; it meant different things in working men's clubs and church halls. And much the same was true of mechanical philosophy, of Humboldt's global physics, and of Einstein's theory of relativity. Their accounts were understood

[20] David Livingstone, *Putting science in its place: Geographies of scientific knowledge*. (Chicago: University of Chicago Press, 2019).

> differently in different locations and mobilised for different cultural and scientific purposes.[21]

In 'Buddhism and Science in the Mirror of Language', Francisca Cho even questions whether Buddhism and science use and understand language in complementary ways, challenging terminology for shared meanings.[22] Accepting the presence of these regional and conceptual variations in the appreciation of knowledge systems does not mean that science or religion cannot be international or universal. However, understanding knowledge's relative nature is necessary to relocate and translate religion into scientific contexts successfully. The culturally and geographically situated dualistic assumption of scientists that their understanding of science and religion was an objective reality probably sustained the mindfulness paradox and crisis. In Chapters 6 and 7, the thesis focuses on the reception of mindfulness in the UK as an example of how medicalised meditation was adopted and applied. Because of the problems of evaluating and aggregating the unique conditions in all the countries consuming and producing scientific understanding about the benefits of meditation, the UK's experience should be considered simply as a case study. However, this also means that generalised conclusions about the development and implications of science in one geographic area, such as the UK, should be treated cautiously.

3. Scientific Buddhism: Seeing Religion as Science and Scientific

One of the central pillars of the medicalisation of mindfulness, documented throughout this thesis, is the unevidenced claims of symmetry or union between Buddhist and scientific

[21] Livingstone, p. 4.
[22] Francisca Cho, "Buddhism and science in the mirror of language." *Religions: A Scholarly Journal* 2014, no. 2 (2014): 11.

principles. However, this idea has frequently been advanced by Western scientists who typically sought to create hybrid knowledge without any systematic explanation or justification.[23] This tendency is not universal, and research is presented in this and the following chapter, that religion and science are seen as ontologically incompatible and so necessarily separate in parts of Asia. I also discuss in this section how knowledge is altered by the process of circulation and relocation, making claims that MBSR reflected traditional Buddhist practices improbable.[24] This issue adds further obstacles to the idea that science and religion, specifically Buddhism, can be integrated as medicalised meditation. In the following sections, I also set out the major and rarely discussed ontological and epistemological reasons why the claimed integration of Buddhist knowledge with the scientific method is highly unlikely. However, in this section, I introduce other limitations and practical problems with integrating religion and science. A corpus of work that demonstrates the different roles that the linking of religion and science have in other settings is also presented.

Kabat-Zinn was neither an experienced Buddhist practitioner nor a Buddhist scholar at the foundation of MBSR. Yet, his career has been punctuated with statements about the close relationship between Buddhism and science. As discussed in Chapter 2, many academics argued that there was common ground between religion and science throughout the 20th century despite the conflict hypothesis.[25] A body of literature has now attempted to offer a wider context to understand and explore the natural and contrived co-existence of religion and science. In an in-depth ethnographic study of science and religion in the context of South Asia, *Science and religion in India: Beyond Disenchantment*, Thomas describes scientist-believers'

[23] Kabat-Zinn, 'Some Reflections on the Origins of MBSR, Skillful Means, and the Trouble with Maps'.
[24] David McMahan, "How meditation works: Theorizing the role of cultural context in Buddhist contemplative practices." *Meditation, Buddhism, and science* (2017): 21-46.
[25] Elaine Howard Ecklund and Jerry Z. Park, 'Conflict Between Religion and Science Among Academic Scientists?', *Journal for the Scientific Study of Religion*, 48.2 (2009), 276–92 <https://doi.org/10.1111/j.1468-5906.2009.01447.x>.

positions in contemporary Indian scientific communities.[26] In doing so, he asks questions about the personal and institutional relationships between belief and science. Thomas also suggests that his work might offer insights into universal issues in science creation:

> While I focus on a particular institution, I argue that this data can be used to make sense of the doing of Indian science in general. Also, the book doesn't intend to present India as a special case, rather it intends to present a case study of universal science – a case of science and religion that has local inflections in India. In that sense this book is not an 'Indian' case study of science, but a case study of 'Science' in an Indian context.[27]

This approach bleeds into my research by highlighting the value of understanding if the scientists involved in developing medicalised mindfulness were invested in the religious practices they were promoting. Being able to demonstrate that Wallace and Kabat-Zinn, amongst others, were, in effect, promoting their religious convictions through their scientific practice runs counter to the observations made by Thomas. I argue that while Indian scientists were able to maintain the boundaries between belief and science, many Western meditation scientists chose to converge or combine religion and science. This finding suggests something fundamentally different in how some Indian and Western scientists engage with religious knowledge.

A divergence between my findings and Thomas's is that he does not attempt to explain the impact of belief on processes of science creation: 'The current book does not deal with the content of science. Instead, the lab is used as a site to understand the religious life of the scientists."[28] Thomas illustrated one reason for this in his 2019 paper, arguing there was no basis for conflict between religion and science and, therefore, presumably, no reason to look for differences in the scientific practices of Indian scientists with religious convictions.[29]

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[26] Renny Thomas, *Science and religion in India: Beyond disenchantment* (Oxford: Routledge, 2021*)*.
[27] Thomas, *Science and religion in India: Beyond disenchantment*, Introduction.
[28] Thomas, *Science and religion in India: Beyond disenchantment*. p. 5.
[29] Thomas, "Beyond conflict and complementarity science and religion in contemporary India." p. 60.

I contend that if Indian scientists maintain the boundaries between belief and science, religious convictions are unlikely to have a major impact on scientific output. The situation in the Western medicalised meditation movement was very different from Thomas's scenario, where attempts to draw religion and science closer together had dramatic and often unwanted effects on the quality of science production.[30]

Thomas also signposts the political dimension present in Indian discourses on the relationship between science and religion. For example, claims of symmetry between Hinduism and science to boost national pride or credibility: 'The notion of complementarity of science and religion that we hear has to do with cultural nationalism, where a particular religion is seen as naturally in relationship with science, in order to claim a superior identity.'[31] There is potential explanatory value here for my work. Cynthia Ann Humes claims the TM movement used science to position their Hindu mantra-based meditation in a favourable light in Western society: 'Maharishi Mahesh Yogi, founder of the Transcendental Meditation Organization, was a prime example of a Hindu leader who appealed to the authority of science to lend his movement legitimacy.'[32] This concept is also supported by the work of other scholars, including Banu Subramaniam's account in *Holy Science: The Biopolitics of Hindu Nationalism* and Meera Nanda's *Science in Saffron: Skeptical Essays on History of Science*.[33] Although such approaches may be less relevant to contemporary Western nations such as the USA or the UK, there are likely to have been cultural, political, and commercial benefits from the notion that mindfulness was simultaneously Buddhist and scientific.

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[30] The problems now observed in the science of mindfulness cannot all be attributed to the convergence of Buddhism and science. For example, many scientists conducted experiments of poor quality without referring to the religious foundations of mindfulness. However, Kabat-Zinn's positioning of MBSR was paradigmatic and established a pattern in MBI research. For full details on limitations present in the scientific engagement with mindfulness, the science of mindfulness see Van Dam and others.

[31] Thomas, "Beyond conflict and complementarity science and religion in contemporary India." p. 61.

[32] Cynthia Ann Humes, 2010. 'The Transcendental Meditation Organization and Its Encounter with Science', in Handbook of Religion and the Authority of Science. 345–370. Leiden: Brill. p. 345.

[33] Banu Subramaniam, *Holy science: The biopolitics of Hindu nationalism, (*Washington: University of Washington Press, 2019). And Meera Nanda, (2016). Science in saffron: skeptical essays on history of science. New Delhi: Three Essays Collective, <https://hdl.handle.net/21.11116/0000-0000-604F-C>.

Chapters 4 and 5 describe how MBSR was positioned as congruent with both science and Buddhism. This claim has always been problematic because it lacks any evidential basis. However, it also rests on an oversimplification that obscures several roles that mindfulness fulfils in society. For example, an attempt to satisfy the lingering aspiration of the Counter-culture for more holistic health practices or offering healthcare agencies the potential of benign, low-cost health interventions. The discussion of 'mental capital' in Chapter 7 provides a concrete illustration of how mindfulness became embedded in a Western materialistic context, totally removed from its original theoretical frameworks. In David McMahan's discussion of meditation, Buddhism, and science, there is a resignation to the idea that once relocated to new settings, Buddhist forms of meditation take on new roles.[34] McMahan's work highlights further obstacles to the narrative of the seamless transition of meditation methods from East to West, arguing that Buddhist meditation becomes part of the knowledge systems importing it:

> The point I am arguing, however, goes a bit further. It asserts that meditation "works" as a systemic part of the ecology of a sociocultural system. It may be used to cultivate available ways of being in a given culture, to challenge them, or to create alternative ones; but it cannot operate in a vacuum. Even if it is introduced to a culture stripped of much of its earlier contexts— as arguably it has in some modern situations— it immediately absorbs culturally available ideas, values, and aspirations, which provide a structure in which the practices become meaningful. This must challenge any account of how meditation works simply in terms of universal states of mind, be they articulated either in the normative terms of tradition or in modern scientific terms. [35]

One premise of medicalised forms of meditation is that they reflect a combination of religious and scientific knowledge in different ways. There is little evidence to support this idea, and recent scholarship indicates medicalised mindfulness may have been an imaginary of Buddhist

[34] McMahan.
[35] McMahan p. 42.

meditation or a device that was helpful to the promotion of Westernised therapeutic interventions.

4. A Brief Account of the Relationship Between Science and Belief from 1900.

Kabat Zinn's first description of MBSR was provided in the 1982 paper, 'An Outpatient Program in Behavioural Medicine for Chronic Pain Patients Based on the Practice of Mindfulness Meditation: Theoretical Considerations and Preliminary Results', published in the April issue of the *General Hospital Psychiatry* journal.[36] The experiments and their scientific relevance are discussed in Chapter 3. Here, the 'Theoretical Considerations' are my main interest. In explaining what mindfulness was and where it came from, Kabat-Zinn set out the theoretical foundations for MBSR as a treatment for chronic pain and provided a blueprint for the future development of mindfulness. The relocation of mindfulness as MBSR reflects Kabat-Zinn's agency as well as changing attitudes in scientific communities and society more generally.[37] Throughout the 20th century, the idea of combining science, particularly psychology, with religion was widely discussed. At the turn of the 20th century, Paul Carus, a writer and philosopher, argued that there were potential symmetries between some religious traditions and science.[38] This concept led him to contend that there was a RoS. The role of Carus in popularising the integration of the spiritual and scientific is described more fully in

[36] Kabat-Zinn, 'An Outpatient Program in Behavioural Medicine for Chronic Pain Patients Based on the Practice of Mindfulness Meditation: Theoretical Considerations and Preliminary Results'.
[37] The road to medicalise mindfulness has a strong connection with changing attitudes to science, medicine, and belief during the rise of the medical Counter-culture in the 1960s and 1970s. However, Kabat-Zinn was also invested in traditional science. He was the son of a renowned scientist (Alvin Zinn) and was supervised in his PhD in molecular biology by the Nobel Laureate Salvador Luria. For an overview of the changing attitudes in medicine, see Saks, 'Medicine and the Counter Culture'.
[38] Donald Harvey Meyer, 'Paul Carus and the Religion of Science', *American Quarterly*, 14.4 (1962), 597–597 <https://doi.org/10.2307/2710135>.

the next Chapter. However, throughout the 20th century, the dominant scientific view was of a conflict between science and religion.[39] Psychologist James Leuba advanced the case of an 'adversarial' relationship in a series of papers published in the first two decades of the 20th century.[40] His view that religion and science were fundamentally incompatible is illustrated by a quotation from his 1912 paper 'Religion and the Discovery of Truth':

> It is sometimes affirmed that science is threatening the very existence of religion. As a matter of fact, that which science is destroying is not religion, but particular religious beliefs, as, for instance, that in a Father who stands to man in the direct personal relation implied in Christian worship.[41]

Eight decades later, Edward Larson and Larry Witham, both historians, confirmed the longevity of the findings of a Leuba study from 1914: 'In 1996, we repeated Leuba's 1914 survey and reported our results in *Nature*. We found little change from 1914 for American scientists generally, with 60.7% expressing disbelief or doubt.'[42] However, more recent research by Elaine Howard Ecklund and Jerry Park argued that the presumed 'conflict paradigm' between science and belief is far more complex than the dichotomy presented by Leuba and others.[43] Ecklund and Park questioned the methodologies of Larson and Witham's survey, arguing that not believing was not the same as perceiving a conflict:

> Instead implicitly assuming that having no religious identity is the same thing as agreeing that there is a conflict between religion and science, thereby leaving the mechanisms by which religious identity and the conflict paradigm are connected, we

[39] Although science and religion have been considered to be in an adversarial relationship, recent scholarship is offering more nuanced narratives, particularly regarding the complex and diverse views held by scientists. See Ecklund and Park, 'Conflict Between Religion and Science Among Academic Scientists?

[40] James H. Leuba, 'Religion and the Discovery of Truth', *The Journal of Philosophy, Psychology and Scientific Methods*, 9.15 (1912), 406–11 <https://doi.org/10.2307/2012644>.

[41] Leuba. p. 410.

[42] Edward J Larson and Larry Witham, 'Scientists Are Still Keeping the Faith', *Nature*, 386.6624 (1997), 435–36 <https://doi.org/10.1038/386435a0>. p. 314.

[43] Ecklund and Park, 'Conflict Between Religion and Science Among Academic Scientists?

> have to some extent opened the black box, finding in the end that lacking a religious identity is not a salient predictor of adopting the conflict paradigm.[44]

Thomas's 2018 study of Indian scientists indicated a comfortable co-existence between individuals' religious and scientific practices: 'Instead of posing science and religion as dichotomous categories, this article demonstrates its easy co-existence within the everyday lives and practices of Indian scientists.'[45] The pattern visible in the literature is that the adversarial relationship in the 20th century, as described by Leuba, gave way in the 21st century to a more complex understanding, where scientific and religious practice were not mutually exclusive.

In the 1950s, a clinical relationship between belief and science was established through the development of Zen Psychotherapy.[46] In 1975, Gary Deatherage brought Buddhist mindfulness meditation into a clinical setting.[47] In 1979, MBSR was first used in an outpatient clinic.[48] The following comparisons between Deatherage's and Kabat-Zinn's approaches provide useful insights into the positioning of mindfulness and the bridging hypothesis.

[44] Ecklund and Park, 'Conflict Between Religion and Science Among Academic Scientists?' p. 289.
[45] Renny Thomas, 'Beyond Conflict and Complementarity Science and Religion in Contemporary India', p. 47.
[46] Engagement between belief based systems and psychology can be seen in areas such as Zen Psychotherapy, see Fromm, *Psychoanalysis and Zen Buddhism*.
[47] Deatherage.
[48] Kabat-Zinn, 'An Outpatient Program in Behavioural Medicine for Chronic Pain Patients Based on the Practice of Mindfulness Meditation: Theoretical Considerations and Preliminary Results'.

5. MBSR's Relationship with Earlier Clinical Forms of Mindfulness

Kabat-Zinn is science-trained; he holds a PhD in molecular biology.[49] His clinical interest in mindfulness represents a dramatic change in his academic trajectory. For example, in 1981, he appears to have co-authored a journal article about sea urchin tube feet, although the name Jonathan, not Jon, is used in the paper.[50] I have found no indication that Kabat-Zinn had formal qualifications in psychology, medicine, Buddhism or religious studies before 1979 to prepare him for the task of aggregating and relocating spiritual practices into modern psychological therapies.[51] From a contemporary perspective, the claims made for MBSR ahead of evidence of its clinical benefits or Buddhist provenance are surprising. Kabat-Zinn reports being the Director of the Cambridge Zen Center and having had exposure to Buddhist teaching and practice.[52] In addition, he was also involved in teaching yoga in the late 1970s. It seems likely that issues concerning the ontologies of psychology or Buddhism would not have been part of his academic training or Buddhist experience. Kabat-Zinn was not working in a conceptual void when he developed MBSR; for example, he drew upon the work of Daniel Goleman and Gary Schwartz, two well-respected meditation scientists, in signposting meditation as an intervention that could reduce stress.[53] There are signs that Kabat-Zinn was attempting to position MBSR as a scientifically validated but novel intervention. These contradictory goals are visible in his 1982 paper, where other medicalised meditation concepts,

[49] Steve Paulson and others, 'Becoming Conscious: The Science of Mindfulness', *Annals of the New York Academy of Sciences*, 1303.1 (2013), 87–104 <https://doi.org/10.1111/nyas.12203>. p. 89.
[50] Jonathan Kabat-Zinn and Robert Singer, 'Sea Urchin Tube Feet: Unique Structures That Allow a Cytological and Molecular Approach to the Study of Actin and Its Gene Expression.', *Journal of Cell Biology*, 89.1 (1981), 109–14 <https://doi.org/10.1083/jcb.89.1.109>.
[51] Kabat-Zinn, 'Some Reflections on the Origins of MBSR, Skillful Means, and the Trouble with Maps'. p. 287.
[52] Kabat-Zinn, 'Some Reflections on the Origins of MBSR, Skillful Means, and the Trouble with Maps'. p. 286.
[53] Daniel J. Goleman and Gary E. Schwartz, 'Meditation as an Intervention in Stress Reactivity', *Journal of Consulting and Clinical Psychology*, 44.3 (1976), 456–66 (p. Goleman) <https://doi.org/10.1037/0022-006X.44.3.456>.

such as the RR, are cited to demonstrate MBSR's continuity with earlier research.[54] However, he does not discuss Gary Deatherage's or Robert Shuster's descriptions of the therapeutic use of mindfulness that predate his work.[55] There is also no reference to the Western psychological insights of mindfulness/mindlessness developed by Ellen Langer and others.[56] This apparent reluctance to link MBSR to specific Eastern or Western mindfulness models in the peer-reviewed literature may have been a simple omission or, more likely, reflect a strategy to create a new mindfulness approach, a personal quest to 'bridge' religious and scientific knowledge.

A comparison between Deatherage's and Kabat-Zinn's relocation of mindfulness provides useful insights into understanding MBSR's scientific location. In a 1975 paper, Deatherage described mindfulness as psychotherapy: 'The purpose of the present report is to briefly discuss one such set of techniques and to demonstrate its use with short-term (2-12 weeks) psychiatric patients in a clinical setting.'[57] This approach differs from Kabat-Zinn's 1982 paper, which reported the results of a pilot project evaluating mindfulness as a treatment for chronic pain.[58] The use of mindfulness for two such different health conditions is puzzling; what underlying mechanism in mindfulness lent itself to psychotherapy and chronic pain self-regulation? Neither paper presents a testable hypothesis to link mindfulness to positive patient outcomes. A significant distinction between the two approaches is that Deatherage used *Satipatthana,* as his mindfulness intervention.[59] This was a simple relocation of a belief-based practice to a clinical environment, where the meditation method largely remained in its original

[54] Kabat-Zinn, 'An Outpatient Program in Behavioural Medicine for Chronic Pain Patients Based on the Practice of Mindfulness Meditation: Theoretical Considerations and Preliminary Results'.
[55] Deatherage. And Richard Schuster, 'Empathy and Mindfulness', *Journal of Humanistic Psychology*, 19.1 (1979), 71–77 <https://doi.org/10.1177/002216787901900107>.
[56] Langer, Blank, and Chanowitz, 'The Mindlessness of Ostensibly Thoughtful Action'.
[57] Deatherage. p. 133.
[58] Kabat-Zinn, 'An Outpatient Program in Behavioral Medicine for Chronic Pain Patients Based on the Practice of Mindfulness Meditation: Theoretical Considerations and Preliminary Results'.
[59] Deatherage. p. 133.

theoretical framework. Deatherage's explanations of the meditation were also traditional, based on commentaries by Buddhist teachers and philosophers:

> Mindfulness is developed from what Thera (1972) chooses to call 'bare attention', an accurate, non-discursive registering of the events taking place in the six sensory modes without any reaction to those events through mental evaluation (good bad), mental comment or naming (book, chair, dog), speech, or behavioral act.[60]

The 'Thera' cited here was Nyanaponika Thera, an ordained Buddhist monk and scholar. Deatherage does not attempt to reposition or reshape *Satipatthana* for a Western audience but recommends the practice where clinically relevant. This approach could also lend *Satipatthana* to pragmatic scientific investigation in much the same way that MBSR was validated: the use of self-reported questionnaires establishing the effects of mindfulness through 'before and after' experiments.

There are similarities in Deatherage's and Kabat-Zinn's anecdotal use of religious texts to support relocation. Both approaches draw on traditional knowledge. But there is no clear explanation of why or how Kabat-Zinn, a microbiologist or Deatherage, a psychologist, were qualified to relocate traditional Buddhist practices. There is also no endorsement of qualified spiritual teachers in their peer-reviewed accounts. This idea is particularly problematic in the development of MBSR, as it represents multiple forms of mindfulness from different knowledge systems. By not having obvious checks and balances on the reliability of the interpretation of traditional knowledge, these examples manifest as processes of subordination—relocation based on outsider scientific perspectives claiming insider knowledge.

[60] Deatherage. p. 134.

The 1982 paper elaborated on the original deployment of MBSR: 'All meditation practices used in the SR&RP were taught independent of the religious and cultural beliefs associated with them in their countries and traditions of origin.'[61] By removing these elements, Kabat-Zinn established a synthesised and individualised interpretation of multiple forms of mindfulness. However, there is a shortage of information to explain how this was achieved, even if it was possible. For example, there is no description of what mindfulness practices were stripped of what 'religious and cultural beliefs' in creating MBSR. Therefore, post-relocation, understanding MBSR became a question of confidence in Kabat-Zinn's account; in one sense, he became the bridging mechanism. Over time, religious scholars such as King have challenged the idea that MBSR could be free of Buddhist (religious) concepts and retain congruence with Buddhism.[62]

There are important distinctions in how Deatherage and Kabat-Zinn describe mindful states. These variances demonstrate the freedom and challenges scientists and scholars had when relocating meditation methods. For Deatherage, mindfulness was ultimately an analytical tool: 'The goal, then, is to come to know and understand one's own mental processes.[63] Deatherage and Kabat-Zinn both indicate knowledge of mental processes as a therapeutic goal, but Kabat-Zinn also stresses the need to translate observations into something else: 'The potential benefit of using meditation for the self-regulation of chronic pain would depend on the patient's developing an ability to observe intense feeling in the body as bare sensation.'[64] Both approaches to using mindfulness engage with complex concepts, many of which were not

[61] Kabat-Zinn, 'An Outpatient Program in Behavioural Medicine for Chronic Pain Patients Based on the Practice of Mindfulness Meditation: Theoretical Considerations and Preliminary Results'. p. 33.
[62] Richard King, '"Paying Attention" in a Digital Economy: Reflections on the Role of Analysis and Judgement Within Contemporary Discourses of Mindfulness and Comparisons with Classical Buddhist Accounts of Sati', in *Handbook of Mindfulness Culture, Context, and Social Engagement*, ed. by Ronald E. Purser, David Forbes, and Adam Burke (Springer, Cham, 2016), pp. 27–45 <https://doi.org/10.1007/978-3-319-44019-4_3>.
[63] Deatherage. p. 134.
[64] Jon Kabat-Zinn, 'An Outpatient Program in Behavioral Medicine for Chronic Pain Patients Based on the Practice of Mindfulness Meditation: Theoretical Considerations and Preliminary Results', *General Hospital Psychiatry*, 4.1 (1982), 33–47 <https://doi.org/10.1016/0163-8343(82)90026-3>. p. 35.

scientifically defined. Deatherage and Kabat-Zinn make claims about the meaning and application of these concepts with little scientific support. This conceptual fluidity is emphasised by Kabat-Zinn's blending of three different techniques (breathing meditation, body scan and yoga) in the MBSR treatment without a scientific explanation of their therapeutic relationship.[65] Why does this matter? If there is no understanding of which of the three techniques brings which therapeutic benefits, understanding what mindfulness is and how it mediates mindful states will remain uncertain. From this brief analysis, it appears the 'bridge' freed MBSR from both Eastern theoretical frameworks, as used in Deatherage's approach, and the Western scientific perspective illustrated by Langer. However, this uncoupling from established knowledge systems inevitably led to a creative or interpretive element in Kabat-Zinn's mindfulness presentation.

6. The Challenge of Relocating Traditional Knowledge to Scientific Domains

This section considers the bridge in the context of Buddhist theoretical frameworks: can Buddhist meditation be integrated with science? Anna Katharina Schaffner, a Professor of Cultural History who researched mindfulness in writing a history of self-improvement, has described how Kabat-Zinn attempted to relocate mindfulness into a universal scientific framework.[66] However, from the examples already considered, there is no clear scientific description of what was relocated, save a claim that it was 'mindfulness', presumably different to the forms that predated Kabat-Zinn's MBSR approach in the West, as these were excluded

[65] A full description of the original format of Kabat-Zinn's MBSR training is provided in Chapter 4.
[66] Anna Katharina Schaffner, *The Art of Self-Improvement: Ten Timeless Truths* (New Haven: Yale University Press, 2021).

from his rationale. Within the psychological sciences, the concept of disciplinary boundaries is well established.[67] While interdisciplinary and transdisciplinary approaches are possible in psychology, the respective theoretical frameworks are rarely integrated or bridged.[68] Therefore, integrating belief-based knowledge into scientific disciplines can lead to theoretical uncertainty.

We must now consider the congruence between psychological sciences and Eastern religious practices. While the idea that spiritual meditation could be integrated with psychology may seem unusual in the current scientific climate, it was a common approach in the medicalised meditation movement during the 1970s.[69] However, the comparison between Deatherage's and Kabat-Zinn's use of mindfulness demonstrates relocation could take different forms. Kabat-Zinn bound MBSR to Eastern religious and philosophical concepts in developing a new pain management therapy.[70] In his 1982 account of MBSR, he used anecdotal reports of Buddhist practices and a wide range of different scientific theories to explain a possible link between meditation and pain management: 'Traditional meditation texts are replete with recommendations for cultivating detachment to intense pain through the specialised use of attention and careful self-observation which characterises mindfulness meditation.'[71] However, the account lacked scientific explanations and evidence of the underlying mechanisms delivering curative potential. It was never explained scientifically, how traditional meditation,

[67] Linda A.W. Brakel, *The Ontology of Psychology: Questioning Foundations in the Philosophy of Mind.*, *The Ontology of Psychology* (Abingdon: Routledge, 2013) <https://doi.org/10.4324/9780203092484-12>.
[68] For a discussion of ontology in social work see Jerome C. Wakefield, 'When an Irresistible Epistemology Meets an Immovable Ontology', *Social Work Research*, 19.1 (1995), 9–17 <https://doi.org/10.1093/swr/19.1.9>.
[69] TM was a spiritual practice and the dominant object of meditation research during the 1970s, Lowe provides a discussion of its nuanced and complex relationship with science here: Scott Lowe, 'Transcendental Meditation, Vedic Science and Science', *Nova Religio: NR : The Journal of Alternative and Emergent Religions*, 14.4 (2011), 54–76 <http://dx.doi.org/10.1525/nr.2011.14.4.54>.
[70] Kabat-Zinn, 'An Outpatient Program in Behavioral Medicine for Chronic Pain Patients Based on the Practice of Mindfulness Meditation: Theoretical Considerations and Preliminary Results'.
[71] Kabat-Zinn cited Buddhist sources that described the management of pain arising as a result of extended periods of spiritual practice. Kabat-Zinn, 'An Outpatient Program in Behavioral Medicine for Chronic Pain Patients Based on the Practice of Mindfulness Meditation: Theoretical Considerations and Preliminary Results'. p. 35.

and in what contexts alleviated pain. In addition, most of the work cited by Kabat-Zinn in his 1982 paper was set in either belief-based or scientific frameworks. There is no reference to ontological concerns, of how Buddhist knowledge could be combined with science. The point is not to say there was no clear rationale; rather, it was not shared in peer-reviewed work.

Without causal explanations and testable hypotheses of how MBSR worked, the main role of science in the early MBSR studies was to pragmatically validate the treatment's benefits. Buddhism is rooted in an intellectual culture of cause and effect.[72] Kabat-Zinn's approach removed mindfulness from its original framework but did not offer a science-led explanation of how it worked. It can be argued that MBSR transformed mindfulness from a practice situated in a rationale framework to a pragmatic intervention, echoing the 'black-box' model of mind associated with behaviourist psychology.[73] A brief reflection on the relocation of acupuncture further illustrates the challenge of relocating non-scientific health technologies to medico-scientific domains.

Acupuncture attracted attention from Western clinicians in several waves over three hundred years; the most recent surge in interest began in the 1950s.[74] The theoretical frameworks of acupuncture are based on the Traditional Chinese Medicine (TCM) knowledge system. TCM utilises concepts abstract to science, such as meridians and acupuncture points, in its theoretical models and treatments.[75] Traditional acupuncture is based on causal explanations, such as why putting a needle into one location in a body leads to changes in another site. Despite extensive anecdotal evidence of acupuncture's curative power, its

[72] Dalai Lama, *The Meaning of Life: Buddhist Perspectives on Cause and Effect* (New York: Simon and Schuster, 2005).
[73] Burrhus Skinner Frederic, 'Cognitive Science and Behaviourism', *British Journal of Psychology*, 76.3 (1985), 291–301 <https://doi.org/10.1111/j.2044-8295.1985.tb01953.x>.
[74] Bivins, 'The Needle and the Lancet: Acupuncture in Britain, 1683–2000'. See also James Morss Churchill, *A Treatise on Acupuncturation* (London: Simpkin & Marshall, 1821).
[75] Myeong Soo Lee and others, 'Differences in Electrical Conduction Properties Between Meridians and Non-Meridians', *The American Journal of Chinese Medicine*, 33.05 (2005), 723–28 <https://doi.org/10.1142/S0192415X05003405>.

underlying concepts have not been integrated into Western medicine.[76] Medico-scientific attempts to exploit 'needling' have relied upon uncoupling the method from its original theoretical framework.[77] Roberta Bivins described the limitations of this approach in her historical account: 'But the example of nineteenth-century acupuncture is also a cautionary one: once fused with the orthodox medicine of the day, and separated from its underlying system of knowledge and expertise, acupuncture proved fragile.'[78] Bivins recounts that James Morss Churchill's 1823 monograph encouraged acupuncture practice free of the original frames of reference. However, once stripped of its theoretical frameworks, the use and understanding of acupuncture became more problematic. As Bivins explains, ontology and epistemology had a fundamental role in the use and development of acupuncture: 'Yet without those maps, and the conjunction of theory and experience which they represented, how was the technique of acupuncture to be systematised and transmitted in an effective form?'[79]

During the 1970s, Felix Mann, an acupuncturist and medical doctor, began training other Western physicians in traditional acupuncture techniques.[80] Later, Mann helped form the British Medical Acupuncture Society (BMAS) and developed a Westernised concept congruent with biomedical models of health.[81] Today, Western Medical Acupuncture (WMA) is used in clinical settings. Still, difficulties remain in understanding the causal relationships between the use of needles and changes to human physiology, which has limited its wider integration into Western medicine. Although comparisons between acupuncture and mindfulness have limitations, there is a symmetry in how processes of medicalisation removed both practices

[76] White, 'Western Medical Acupuncture: A Definition.'
[77] Adrian White, 'Western Medical Acupuncture: A Definition.', *Acupuncture in Medicine : Journal of the British Medical Acupuncture Society*, 27.1 (2009), 33–35 <https://doi.org/10.1136/aim.2008.000372>.
[78] Bivins, 'The Needle and the Lancet: Acupuncture in Britain, 1683–2000'. p. 12.
[79] Bivins, 'The Needle and the Lancet: Acupuncture in Britain, 1683–2000'. p. 10.
[80] Peter Baldry, 'The Integration of Acupuncture within Medicine in the UK – the British Medical Acupuncture Society—s 25Th Anniversary', *Acupuncture in Medicine*, 23.1 (2005), 2–12 <https://doi.org/10.1136/aim.23.1.2>.
[81] White, 'Western Medical Acupuncture: A Definition.'

from their original ontology, altering their essential nature. The example of acupuncture supports a hypothesis that if the theoretical frameworks of a belief-based practice are incongruent with positivism, the technique must be translated into concepts accessible to science. However, it appears that reformulating those concepts without sophisticated insider knowledge will likely change the nature of the methods, thus altering the original causal explanations and potentially developing a hybrid Westernised form. The creation of MBSR was even more problematic than that of WMA because Kabat-Zinn placed religious practices and science into a conceptual partnership.

7. Western Understanding of Eastern Knowledge: Conceptual Colonialism?

This section will first briefly discuss the original claim that MBSR represented an overarching concept from multiple Eastern religio-philosophical knowledge systems. I will then investigate the possible congruence between Buddhist knowledge and science and the implications for mindfulness's theoretical frameworks. As discussed in the Introduction, a complication in understanding the relocation of mindfulness is fluidity in its descriptions. In 1982, Kabat-Zinn suggested that mindfulness meditation was a pan-spiritual practice:

> Mindfulness meditation has roots in Theravada Buddhism where it is known as *sattipatana vipassana* or Insight Meditation, in Mahayana Buddhism, Soto Zen practices, and in the yogic traditions as expressed in the contemporary writings of J. Krishnamurti, Vimla Thakar and Nisargadatta Maharaja. [82]

[82] Kabat-Zinn, 'An Outpatient Program in Behavioural Medicine for Chronic Pain Patients Based on the Practice of Mindfulness Meditation: Theoretical Considerations and Preliminary Results'. p. 34.

Over time, MBSR became more closely linked with Buddhism. In Kabat-Zinn's 2011 retrospective, he made his strongest claim up to that point about the relationship between mindfulness and Buddhist knowledge:

> Naming what we were doing in the clinic mindfulness-based stress reduction raises a number of questions. One is the wisdom of using the word mindfulness intentionally as an umbrella term to describe our work and to link it explicitly with what I have always considered to be a universal dharma that is co-extensive, if not identical, with the teachings of the Buddha, the Buddhadharma.[83]

The precise form(s) of mindfulness adopted by Kabat-Zinn are never explained; his overarching descriptions suggest they are a fusion of Eastern spiritual practices. The breadth and depth of knowledge contained in the different religious and philosophical traditions cited by Kabat-Zinn are immense. In some respects, Kabat-Zinn was generalising and then aggregating the product of thousands of years of spiritual thought and practice. In addition, the MBSR method also contained elements of hatha yoga, originally a Hindu technique.[84] Almost as an aside, Kabat-Zinn acknowledged in his 1982 study that yoga was not a mindfulness practice: 'Although hatha yoga *per se* is not a traditional mindfulness technique, it was taught emphasizing mindfulness.'[85] A major and unresolved problem is that if non-mindfulness behaviours could be taught 'mindfully', the boundaries between mindfulness and mindlessness become blurred.

The ontological similarities between the cited Eastern knowledge traditions are under-researched. However, Kabat-Zinn offered little scientific evidence supporting the claim that mindfulness meditation was a uniform concept across multiple knowledge traditions. This kind

[83] Kabat-Zinn, 'Some Reflections on the Origins of MBSR, Skillful Means, and the Trouble with Maps'. p. 290.
[84] Kabat-Zinn, 'An Outpatient Program in Behavioural Medicine for Chronic Pain Patients Based on the Practice of Mindfulness Meditation: Theoretical Considerations and Preliminary Results'. p 36.
[85] Kabat-Zinn, 'An Outpatient Program in Behavioural Medicine for Chronic Pain Patients Based on the Practice of Mindfulness Meditation: Theoretical Considerations and Preliminary Results'. p. 36.

of aggregation of religious knowledge had been seen before in the medicalised meditation movement. Herbert Benson (who received an acknowledgement in Kabat-Zinn's 1982 paper) had made such assumptions in developing the RR hypothesis.[86] As will be discussed in Chapter 3, Herbert Benson and others published *The Relaxation Response* in 1974. This journal article claimed that a wide range of religious practices contained four key components that elicited the RR, a universal relaxed state: 'Techniques have existed for centuries, usually within a religious context, which allow an individual to experience the relaxation response.'[87] Kabat-Zinn's claims for MBSR may have been following the same generalised approach, but MBSR also aspired to draw religious knowledge and science into closer alignment.

Kabat-Zinn's 1982 paper does not offer a functional scientific description of the cognitive processes of MBSR. Therefore, an alternative approach to establishing the theoretical foundations of MBSR is to look at its operational components. In Kabat-Zinn's 1982 paper, three training elements are identified: the body sweep or scan, the mindfulness of breath and hatha yoga postures.[88] I have been unable to locate any traditional form of mindfulness that combines these three elements, so we should consider MBSR as a unique version of mindfulness, at the very least. In 2020, Bhikkhu Anālayo, an ordained Buddhist, claimed in a peer-reviewed paper that the use of the body scan and mindfulness of breath may have been imported from the Burmese (Myanmar) Insight Movement developed by Ledi Sayadaw.[89] The Insight Movement began life as a reaction against a perceived threat to Buddhism from British Christian missionaries in colonial Burma.[90] A local monk, Ledi Sayadaw, helped to reform

[86] Herbert Benson, John F. Beary, and Mark P. Carol, 'The Relaxation Response', *Psychiatry*, 37.1 (1974), 37–46 <https://doi.org/10.1080/00332747.1974.11023785>.
[87] Benson, Beary, and Carol, 'The Relaxation Response'. p. 33.
[88] Kabat-Zinn, 'An Outpatient Program in Behavioral Medicine for Chronic Pain Patients Based on the Practice of Mindfulness Meditation: Theoretical Considerations and Preliminary Results'. p. 36.
[89] Bhikkhu Anālayo, 'Buddhist Antecedents to the Body Scan Meditation', *Mindfulness*, 11.1 (2020), 194–202 <https://doi.org/10.1007/s12671-019-01259-8>.
[90] Erik. Braun, *The Birth of Insight: Meditation, Modern Buddhism, and the Burmese Monk Ledi Sayadaw.* (Chicago: University of Chicago Press, 2013).

traditional Theravadan Buddhist approaches into more widely accessible forms such as *vipassana* (insight) meditation. Over time, the movement became international, and we know that Kabat-Zinn attended an Insight Meditation Society (IMS) retreat shortly before he launched MBSR.[91] If MBSR reflects methods popularised by Sayadaw, with the addition of a posture yoga component, the relationship between MBSR and other Buddhist and yogic practices requires reconsideration.

In 2011, Kabat-Zinn described a consistency between MBSRs and MBIs and all Buddhist knowledge: 'that MBSR and other mindfulness-based interventions be grounded in a universal dharma understanding that is congruent with Buddhadharma.'[92] As explained earlier, *Buddhadharma* was likely used to indicate an overarching Buddhist worldview. However, there are several problems with this position. Firstly, Buddhism is not a singular set of ideas and practices; it comprises three major schools (vehicles) from which cascade down numerous traditions.[93] Despite common elements in their approaches, the three vehicles, Theravada, Mahayana, and Vajrayana, have distinct ontologies. Although often viewed in the West as a unified spiritual tradition, the overarching concept of 'Buddhism' is regarded by some scholars as a creation of colonial forces. The social psychologist Steven Stanley made this point in 2012: 'There is no Asian language word for "Buddhism" or "Buddhist"; the words were creations of Victorian imperialist colonisers attempting to understand and control "Buddhism" for their own ends.'[94] Other Buddhist experts, including George Dreyfus, even challenge attempts to reduce mindfulness to a singular version: 'Buddhism is a plural tradition that has evolved over centuries to include many views about mindfulness. Hence, there is no single view that can

[91] For details of the retreat see Kabat-Zinn, 'Some Reflections on the Origins of MBSR, Skillful Means, and the Trouble with Maps'. p. 287. For the use of the term awareness meditation see J. Kabat-Zinn and R. Burney, 'The Clinical Use of Awareness Meditation in the Self-Regulation of Chronic Pain', *Pain*, 11 (1981), S273 <https://doi.org/10.1016/0304-3959(81)90541-8>.
[92] Kabat-Zinn, 'Some Reflections on the Origins of MBSR, Skillful Means, and the Trouble with Maps'. p. 281.
[93] Peter Harvey, *An Introduction to Buddhism* (Cambridge: Cambridge University Press, 2012).
[94] Steven Stanley, 'Mindfulness: Towards A Critical Relational Perspective', *Social and Personality Psychology Compass*, 6.9 (2012), 631–41 <https://doi.org/10.1111/j.1751-9004.2012.00454.x>. p. 633.

ever hope to qualify as 'the Buddhist view of mindfulness.''[95] Researcher Rupert Gethin came to a similar conclusion, arguing that mindfulness is not a single defined concept, and its meaning and location have been in motion for centuries.[96] So, even if traditional mindfulness is considered Buddhist-inspired, it probably cannot be reduced to a single practice. In a paper discussing the relationship between different Buddhist forms of mindfulness published in 2015, the religious studies scholar John Dunne estimates there are at least three mindfulness methods in classical (scriptural) Buddhism: *vipassana*, *samatha* and mind training. In addition, there are six nondual traditions: Chan, Zen, Seon, Mahamudra, Dzogchen and the Thai Forest, each with distinct mindfulness methods.[97] In actuality, the total number of mindfulness practices is unknown as no comprehensive catalogue of Buddhist meditation methods is available for all the different schools. On balance, the idea that MBSR could represent a pan-Buddhist interpretation of mindfulness meditation, consistent with ontologically distinct Buddhist vehicles, seems unlikely.

King's work in this field also raises doubts about the pan-Buddhist credentials of mindfulness, arguing that its definitions may place it at odds with some Buddhist traditions but not others. In an essay titled 'Paying Attention" in a Digital Economy: Reflections on the Role of Analysis and Judgement Within Contemporary Discourses of Mindfulness and Comparisons with Classical Buddhist Accounts of Sati', King, in 2015, illustrated the problems in attempting to create pan-Buddhist concepts:

> Although the historical roots of the modern 'mindfulness-only' movement spring from late colonial Burma and Theravāda reformism, as Dunne suggests, the theoretical

[95] Georges Dreyfus, 'Is Mindfulness Present-Centred and Non-Judgmental? A Discussion of the Cognitivedimensions of Mindfulness', *Contemporary Buddhism*, 2011. p.42.
[96] Rupert Gethin, 'Buddhist Conceptualizations of Mindfulness', in *Handbook of Mindfulness: Theory, Research, and Practice*, ed. by Kirk Brown, J. David Creswell, and Richard Ryan (New York: The Guildford Press, 2015), pp. 9–41.
[97] John D. Dunne, 'Buddhist Styles of Mindfulness: A Heuristic Approach', in *Handbook of Mindfulness and Self-Regulation* (New York, NY: Springer New York, 2015), pp. 251–70 <https://doi.org/10.1007/978-1-4939-2263-5_18>. p. 259.

> framework for modern mindfulness discourse often bears a closer resemblance to some forms of non-dualistic Mahāyāna and Vajrayāna conceptions of meditative practice.[98]

Dunne raised similar issues in his earlier cited work.[99]

Putting to one side the idea that MBSR was pan-spiritual or pan-Buddhist, positioning mindfulness within a specific Buddhist tradition is also difficult. In considering if medicalised mindfulness is Buddhist, the scholar Robert Sharf draws attention to a central element of MBIs, 'bare attention'.[100] While bare attention is a component of reformed insight practices, its role in Buddhist (Theravadan) mindfulness is problematic:

> Modern exponents of mindfulness meditation promote the therapeutic effects of "bare attention"— a sort of non-judgmental, non-discursive attending to the moment-to-moment flow of consciousness. This approach to Buddhist meditation can be traced to Burmese Buddhist reform movements of the first half of the 20th century, and is arguably at odds with more traditional Theravada Buddhist doctrine and meditative practices.[101]

Sharf argues that if mindfulness was based on practices from the Insight Meditation Movement, it might not align with scriptural Buddhist traditions. If Sharf is right, rather than a new pan-Buddhist form of meditation, mindfulness was inspired by Kabat-Zinn's exposure to insight meditation and supported with the addition of posture yoga. This is a possibility considered by Analayo.[102] The religious studies scholar George Dreyfus shared Sharf's concerns, arguing that misunderstanding of the term mindfulness misdirected the scientific investigation:

[98] King. "Paying Attention" in a Digital Economy: Reflections on the Role of Analysis and Judgement Within Contemporary Discourses of Mindfulness and Comparisons with Classical Buddhist Accounts of Sati'. p. 32.
[99] Dunne discusses the issue on page 257 of his paper and considers the positions of Bhikkhu Bodhi, Rupert Gethin and Alan Wallace, see Dunne.
[100] Sharf, 'Is Mindfulness Buddhist? (And Why It Matters)'.
[101] Sharf, 'Is Mindfulness Buddhist? (And Why It Matters)'. p. 470.
[102] Anālayo.

> I believe that the consequences of the misleading presentation of mindfulness as present-centred non-judgmental awareness can be seen clearly in the cognitive scientific literature. There, mindfulness is almost invariably introduced as a therapy, similar to a relaxation technique or a psychological method of self-acceptance. It is almost never presented as having important cognitive functions. Its absence is glaring in the considerable literature concerning the awareness of intentions, their role in action and the degree to which they play causal roles. I am deeply struck by the fact that I have never seen the idea of mindfulness mentioned in this context or heard about its use in relevant experiments.[103]

Dreyfus claims that rather than acting as a bridge with traditional knowledge, MBSR may have taken science away from Buddhist forms of mindfulness.

This brief review of the relationship between medicalised mindfulness and Buddhist practices does not offer a definitive view of MBSR. However, on balance, it seems likely that MBSR reflected a limited personal view of Buddhism without reference to the Buddhist practices Kabat-Zinn claims to have synthesised. It appears that no one version of mindfulness can reflect the richness of different Buddhist understandings. However, there is evidence that Kabat-Zinn's approach has theoretical links to the reformed Buddhist tradition established by Ledi Sayadaw, with the improbable addition of posture yoga.

Potential ontological differences with Buddhist traditions may also preclude the relocation of Buddhist knowledge to scientific domains and the aggregation of mindfulness practices from Buddhist vehicles. Buddhist traditions are built on non-positivist worldviews. Taking the Mahayana tradition for example, meditation practice is linked to complex philosophical and belief-based concepts inaccessible to psychology, such as the role of subtle energy in human consciousness.[104] Even greater incongruence exists when considering Mahayana ontology, which partially rests on the concept of emptiness. This issue was discussed from a psychological perspective by William Van Gordon, Edo Shonin and Mark Griffiths in

[103] Dreyfus. p. 53.
[104] Dalai Lama and Jinpa Thubten, VOL. 1. p. 381.

a paper from 2017: 'Emptiness asserts that all phenomena –including the "self" –are empty of intrinsic existence.'[105] Van Gordon and others argue that Western psychology does not currently accept the principles of emptiness and views it from an outsider's perspective.[106] This example oversimplifies a very complex idea but illustrates the huge challenges of bridging the world views of Buddhist traditions and science. Emptiness is just one of many tenets underpinning Buddhist ontologies, which are unlikely to be congruent with science. However, another problem of claiming a bridge between Buddhism and science is that different Buddhist vehicles do not share the same theoretical frameworks. Staying with the foundational concept of emptiness, Van Gordon and others have highlighted different meanings in Buddhist traditions: 'Some scholars draw distinctions between "Theravada non-self" and "Mahayana emptiness" by asserting that emptiness encompasses the notion of non-self but extends beyond the "self" to include all phenomena.'[107]

Even considering Buddhist knowledge from an Aristotelian ontological perspective is problematic, meaning congruence with science may be impossible or require a completely new frame of reference. The Buddhist scholar Noa Ronkin describes the problem of comparing science with scriptural Buddhism:

> Buddhist thought has thrived on such an anti-substantialist, processual outlook: the dhammas that the Buddha discusses and that the early Abhidhamma categorises are not the Aristotelian primary substances, but mental and physical occurrences, whether processes or events.[108]

[105] William Van Gordon, Edo Shonin, and Mark D. Griffiths, 'Buddhist Emptiness Theory: Implications for Psychology', *Psychology of Religion and Spirituality*, 9.4 (2017), 309–18 <https://doi.org/10.1037/rel0000079>.
[106] Van Gordon, Shonin, and Griffiths. p. 309.
[107] Van Gordon, Shonin, and Griffiths. p. 311.
[108] Noa Ronkin, *Early Buddhist Metaphysics: The Making of a Philosophical Tradition* (London: Routledge, 2005). p. 139.

Without more research, claims of theoretical and operational symmetries between any or all Buddhist forms of meditation and MBSR should be treated cautiously. Dreyfus illustrated some of these problems in his 2011 discussion of the cognitive components of mindfulness.[109]

Many scholars have applauded the aspiration to introduce Buddhist practices and values into contemporary psychological interventions. For example, Bhikkhu Bodhi (an ordained Buddhist monk) has stressed, 'If such practices benefit those who do not accept the full framework of Buddhist teaching, I see no reason to grudge them the right to take what they need.'[110] Meditation has always migrated and evolved, so there is no reason that mindfulness should not be of interest to Western medicine. However, the theoretical and methodological uncertainty created by claiming MBSR as a bridge between science and Buddhism may have limited rather than enhanced scientific understanding of traditional meditation's curative potential.

8. Conclusions

Over the last century, scholars have made conflicting claims about the relationships between religion and science. Historically, these positions have been adversarial, coexisting and complementary, largely based on a Western binary conception of the relationship between belief and science. These insights also confirm that the disciplinary boundaries between religion and science are not fixed; rather, they are mediated by several factors, including sociocultural norms and the beliefs of individual scientists. Research has demonstrated that Indian scientists maintain scientific and religious convictions as separate 'nodes of

[109] Georges Dreyfus, 'Is Mindfulness Present-Centred and Non-Judgmental? A Discussion of the Cognitive Dimensions of Mindfulness', *Contemporary Buddhism*, 2011.
[110] Bhikkhu Bodhi, 'What Does Mindfulness Really Mean? A Canonical Perspective', *Contemporary Buddhism*, 12.1 (2011), 19–39 <https://doi.org/10.1080/14639947.2011.564813>. p. 36.

existence'.[111] However, the relocation of mindfulness to the West introduced a new configuration, the integrating or bridging of Buddhist ideas with psychological sciences. Kabat-Zinn's attempts to combine incongruent ways of knowing likely reflect a Western dualistic understanding of the relationship between science and religion.

When Kabat-Zinn published his first discussion of the theoretical frameworks of MBSR in 1982, he did not reference the Western scientific understanding developed by Langer or the relocation of Buddhist mindfulness of Deatherage. Rather, he positioned his work as a radical synthesis of spiritual mindfulness congruent with science. However, without a supporting theoretical framework, there was great freedom in developing the concept. By re-configuring religious forms of mindfulness and not establishing a testable scientific explanation, MBSR had some independence from Buddhist and scientific theoretical frameworks. MBSR appears to have been a partial uncoupling rather than a bridging mechanism, not strictly Buddhist nor scientific. In this vacuum, Kabat-Zinn positioned himself as 'the bridge', the only person able to explain how the reductive MBSR intervention could reliably reflect the pan-spiritual or pan-Buddhist concepts of mindfulness. This failure to explain how MBSR was developed and its scientific relationship with religion or science likely led to criticisms of mindfulness from scientists and scholars of religious studies.

A comparison between Kabat-Zinn's 1982 and Deatherage's 1975 mindfulness papers confirms the freedom available to scientists and clinicians relocating traditional knowledge during that time. There was a lack of systematic evaluation of the practices, and no testable hypotheses evidenced a causal link between mindfulness meditation and the presumed health benefits. Based on the literature, it is uncertain if Kabat-Zinn or Deatherage had sufficient knowledge or experience to reliably relocate spiritual practices as psychological therapies. A major limitation in their published accounts is the sparse detail of cognitive explanation of the

[111] Thomas, 'Beyond Conflict and Complementarity Science and Religion in Contemporary India'. p. 62.

original practices and how they mediated human health. It seems that their belief in the curative potential of religious meditation may have diluted their scientific discrimination.

The scant attention given to the relocation process and the relevant knowledge and experience of the architects of relocation indicates a subordination of Buddhist thought and practice to medico-scientific domains. The early claims made by Kabat-Zinn passed through the peer-review process despite the issues outlined in this chapter. The objective measurement of the effects of belief-based meditation on patients requires no specialist knowledge outside of the traditional medico-scientific training. Claims to have aggregated the essence of practices from multiple spiritual traditions and converted it to a science-friendly, Westernised equivalent is a much more complex undertaking. In the early MBSR literature, there is little evidence of knowledge co-production with experts in Buddhist meditation. Over time, scientists readily accepted the 'bridging' hypothesis despite warnings of theoretical limitations and misunderstandings in strategic reviews.

The work of several religious studies scholars over the last twenty years raises difficult questions about Kabat-Zinn's claim that MBSR was congruent with 'Buddhism'. The balance of evidence in these peer-reviewed papers indicates that the reformed Buddhist insight tradition may have influenced the creation of MBSR. The juxtaposition of hatha yoga with breathing and body scan techniques also suggests that MBSR was a composite practice that was both similar and different from other meditation techniques. The relocation of mindfulness likely represents Kabat-Zinn's interpretation of traditional religious practices rather than a systematic attempt to relocate the many forms of mindfulness practised in spiritual traditions.

Major ontological barriers exist to reliably combining spiritual practices from different religions and then introducing this essence into a positivist domain. The absence of a scientific explanation for the relocation has hampered the creation of a reliable theoretical framework for mindfulness. These limitations do not necessarily challenge the positive motivation of Kabat-

Zinn nor the curative potential of MBSR. Still, they make establishing a robust scientific validation for MBSR and many MBIs highly unlikely.

Western scholarly understandings of Buddhist traditions have developed since Kabat-Zinn published the description of MBSR in 1982. However, the claimed congruence between MBSR and multiple traditional spiritual practices went largely unchallenged by scientists for decades. More research is needed to explore the role of unevidenced generalisations about spiritual knowledge in scientific papers during the 1970s and 1980s. Scholars have argued that attempts to reduce Buddhism to a unitary belief system began as a colonial practice. There is a case to reconsider terms such as 'Buddhist' and 'Eastern' in meditation research from a post-colonial perspective.

Bivins's research suggests that integrating non-scientific medical techniques into medico-scientific domains is problematic. One lesson from acupuncture is that subordinating non-scientific knowledge carries problems of theoretical confusion and a potential reduction of the curative potential. The lack of a robust theoretical framework for medicalised mindfulness likely led to the reluctance of scientists to establish the testable scientific hypotheses usually required to achieve reliable scientific validation. Cause and effect are central to the Buddhist worldview; paradoxically, the relocation of mindfulness to the psychological sciences appears to have moved the practice from a causal to a pragmatic rationale.

The scientific understanding of the effects of soteriological meditation on health is complex, and initial limitations in its scientific study should be expected. However, the lack of a systematic approach to support the bridging hypothesis was a major weakness in the creation of MBSR. Failing to describe traditional mindfulness from a cognitive perspective, how the techniques were relocated and what they became theoretically and operationally built uncertainty and flexibility into Kabat-Zinn's paradigm. Historically, the relocation of

mindfulness warns about the dangers of combining knowledge from ontologically distinct systems without addressing the potential for incongruence and misunderstanding.

By using the relocation of mindfulness as a case study, several broader issues are highlighted. Not least, how does science conceptualise non-science? On what basis did Western scientists claim to understand non-scientific knowledge, particularly when using a Western, outsider frame of reference? Unless scientific enquiry considers a process of knowledge co-production in dealing with religious knowledge, subordination and cultural appropriation seem almost inevitable. Evidence suggests that MBSR does not encompass the full range of Buddhist mindfulness practices; as such, MBSR and MBI research may have focused on a Western imaginary of Buddhist mindfulness. The curative potential of many traditional mindfulness methods is still unknown. It is legitimate for scientists to develop Buddhist-inspired clinical interventions. It is also appropriate for scientists to explore traditional practices on their own terms. The evidence emerging from this chapter is that the psychological sciences need more sophisticated ways of knowing if they wish to gain insider knowledge of non-scientific concepts and practices. The continuing problem of the mindfulness paradox illustrates a pressing need to re-evaluate the theoretical frameworks used in the scientific investigation of meditation. It seems inevitable that the theoretical uncertainty established in the MBSR paradigm would lead to a lack of clarity concerning mindfulness and how it worked, which was problematic for experimental enquiry.

Chapter 2: The Foundations of the Science of Meditation: 1938 to 1969

1. Introduction

Today, the study of meditation is embedded in the medico-scientific mainstream. New disciplines, such as contemplative neuroscience, attempt to understand the health potential of human technologies once thought of as exclusively spiritual.[1] There is an ongoing dialogue between religious figures and scientists regarding the nature of meditation and the progression of its scientific investigation.[2] For example, in 1987, H.H. The Dalai Lama and scientist Francisco Varela were two of the founding members of the Mind Life Institute, an organisation promoting interaction between science and contemplative traditions.[3] More recently, the Buddhist monk and trained scientist Matthieu Ricard has been a frequent collaborator in meditation experiments (Figure 5). As illustrated in Chapter 1, the boundaries between religion and science are fluid and subject to socio-cultural forces and the agency of scientists, amongst many other factors. The opportunity for Kabat-Zinn to develop MBSR largely depended on the conditions created by the scientific study of meditation before 1970 and the shifting relationship between Eastern religions and science that took place during this period.

[1] Aviva Berkovich-Ohana, Patricia A. Jennings, and Shiri Lavy, 'Contemplative Neuroscience, Self-Awareness, and Education', in *Progress in Brain Research* (Elsevier B.V., 2019), CCXLIV, 355–85 <https://doi.org/10.1016/bs.pbr.2018.10.015>.

[2] This popular science article illustrates the collaboration of scientist-practitioners and Buddhists engaged with science. Matthieu Ricard, Antoine Lutz, and Richard J. Davidson, 'Mind of the Meditator', *Scientific American*, 311.5 (2014), 38–45. For a discussion of the relationship from a neuroscientific rather than a meditative perspective, see David E. Presti, 'Collaborative Dialogue between Buddhism and Science: A Contribution to Expanding a Science of Consciousness', *Journal of Comparative Neurology*, 528.17 (2020), 2804–15 <https://doi.org/10.1002/cne.24876>.

[3] Mind & Life Institute, 'About Mind & Life', *Mind & Life Institute* <https://www.mindandlife.org/about/> [accessed 15 November 2021].

Fig. 5. Wearing a 128-channel geodesic sensor net, Buddhist monk Matthieu Ricard sits in a soundproof room and prepares for an electroencephalography (EEG) test at the EEG facility in the Waisman Center at the University of Wisconsin-Madison on June 5, 2008. Photo, University of Wisconsin-Madison/Jeff Miller.

This chapter sets out the origins of the experimental relationship between science and meditation from the 1930s, charts its progress during the 1950s and 1960s and outlines multiple interconnected strands that contributed to the integration of belief-based practices in medico-scientific domains. Between 1938 and 1969, researchers established the initial rationales and methodologies for the scientific study of meditation and meditation practitioners (the science of meditation). The use of electroencephalography (EEG) to monitor electrical activity in the brain became a staple of meditation research. Scientists frequently combined EEG data with other observations, such as heart rate and oxygen consumption, to establish the physiological effects of meditation practice on the body and mind. As meditation research progressed, scientists also explored relationships between meditation, mental states and health. This motivation is illustrated by Koji Sato's description of the mental health benefits of practising Zen.[4] Researching at Kyoto University in 1958, Sato published a paper, 'Psychotherapeutic Implications of Zen' in the *Psychologia* journal, claiming: 'The purpose of Zen training is to get awakening (Satori) through a kind of psychophysiological adjustment. This adjustment promotes both vitality and higher mental activity.'[5] Similar attitudes are visible within a scientific investigation undertaken in Japan a decade later, Yasusaburo Sugi and Kunio Akutsu's 1968 work, 'Studies on Respiration and Energy-Metabolism During Sitting in Zazen'.[6] Sugi and Akutsu demonstrated an openness to both scientific and religious knowledge: 'Zen is not theory, Religious truth in Buddhism is to be experienced through the practice of Zazen.'[7] These examples suggest that Japanese scientists were willing to discuss spiritual values in a scientific context without narrowing disciplinary boundaries so that they could work with both scientific and Zen paradigms.

[4] Koji Sato, 'Psychotherapeutic Implications of Zen', *Psychologia*, 1.4 (1958), 213–18 <https://doi.org/10.2117/psysoc.1958.213>.
[5] Sato. p. 218.
[6] Yasusaburo Sugi and Kunio Akutsu, 'Studies on Respiration and Energy-Metabolism During Sittiing in Zazen', 体育学研究, 12.3 (1968), 190–206 <https://doi.org/10.5432/jjpehss.KJ00003395104>.
[7] Sugi and Akutsu. p. 190.

As scientists based in countries with enduring belief-based meditation traditions (India and Japan) were prominent in the early stages of meditation research, we should not be surprised about this openness to the viability of spiritual practices and their value as points of reference to peer-reviewed investigations. Significant progress was made in the 1960s and 1970s in gathering data illustrating the effects of meditation. These were generally traditional positivist studies with scientists objectively recording changes in participants. But things were set to change. In May 1969, the first signs of medicalised meditation became visible when the TM organisation collaborated with Indian scientists to illustrate the curative potential of meditation in a study reported by Peter Hazelhurst in *The Times of London:*

> In a unique research programme, leading Indian scientists have investigated transcendental meditation to test the claims of yogis, hippies and other advocates of Indian mysticism.
> The scientific study of meditation is being conducted at the physiology department of the All India Institute of Medical Sciences in Delhi.
> Among others, the Beatles' erstwhile guru, the Maharishi Yogi of Rishikesh, appears confident that his brand of instant meditation will stand scientific examination and eight disciples have been sent to Delhi to take part in experiments. For the next few months they will be asked to meditate while electronic equipment records their heart, pulse and brain processes.[8]

There are clear signs of shifting boundaries here as TM practitioners volunteered (self-selected) to participate in experiments attempting to demonstrate the benefits of TM. Descriptions of experiments and scientific accounts are central to this history; they alone cannot explain the convergence of Buddhist and Hindu meditation methods with science.

Discussing the wider social and historical conditions that supported the relocation of belief-based practices from East to West is crucial to understanding the circumstances that led to the development of mindfulness. Once these rationales are established in Section 2 below,

[8] Peter Hazelhurst, 'Yogis' Claims Are Put to the Test', *The Times* (London, 19 May 1969), p. 8. <link-gale-com.chain.kent.ac.uk/apps/doc/CS134967475/TTDA?u=uokent&sid=bookmark-TTDA&xid=0062e219> [Accessed 29 October 2023]

the relocation and acceptance of meditation practices will be described in Section 3, where I will also investigate the relocation and reception of belief-based meditation in the West. The development of Zen Psychotherapy is analysed in Section 4. The historical account of the science of meditation begins in Section 5. The role of EEG technologies in meditation research is outlined in Section 6. The consolidation of early findings from meditation research during the 1960s is described in Section 7, with the conclusions provided in Section 8.

2. Knowledge Circulates Through Temporal and Geographic Boundaries

One of the challenges in writing a scientific history of mindfulness is keeping track of boundaries between the religious and secular, the East and West and what constitutes belief or science. The use of Buddhist ideas in Kabat-Zinn's work indicates that concepts, language and beliefs were in motion during the middle decades of the 20th century. Relocating Buddhist and Hindu practices to Western laboratories illustrates complex relationships between modern science and ancient meditation practices. Therefore, the development of medicalised meditation provides a living example of how knowledge can circulate rather than travel in single directions from creators to consumers across space and time.

Kapil Raj describes the concept of knowledge circulation, particularly from a post-colonial perspective, presenting it in contrast to the notion of knowledge transmission as a one-way communication process:

> More important, however, the term "circulation" serves as a strong counterpoint to the unidirectionality of "diffusion" or even of "dissemination" or "transmission" of binaries such as metropolitan science/colonial science or center/periphery, which all imply a producer and an end-user.[9]

[9] Kapil Raj, 'Beyond Postcolonialism... and Postpositivism: Circulation and the Global History of Science', *ISIS*, 104.2 (2013), 337–47 <https://doi.org/10.1086/670951>. p. 346.

However, the fact that knowledge circulates does not necessarily mean it is reliably understood or applied in its original forms when relocated. In describing the transcultural origins of mindfulness, the religious studies scholar Sharf suggests that as a derivative of Insight Meditation, mindfulness was not foundational to Buddhist thought and practice, but this distinction may not have been understood in medico-scientific domains:

> To conclude, it is my impression that many of the psychologists, cognitive scientists, and sociologists doing research on Burmese style mindfulness practices seem to assume that the psychological benefits of such practice are born out by centuries of Buddhist experience. Such is not the case. To the extent that the modern approach to mindfulness can be found in premodern Asia, it was a minority position that was met with considerable criticism from traditional quarters.[10]

While this clarification may be of particular interest to meditation scientists looking to understand the origins of mindfulness, its role here is to highlight the complex intersections on which meditation knowledge has been created and shared. Imprecise claims that a relocated meditation practice is 'Buddhist' or the synthesis of Buddhist practices will likely obscure the cognitive processes engaged in the original methods.

The close relationship between insight and mindfulness meditation is described by Tamara Ditrich in her 2016 study, 'Buddhism between Asia and Europe: The Concept of Mindfulness through a Historical Lens'.[11] As Sharf contended, insight meditation was a reformed Buddhist movement, but it was developed as a reaction to Christian missionary activity in Burma at the end of the 19th century. Ditrich argues that ironically, in Burma, Buddhism was reorganised to reflect elements of Christianity:

[10] Robert H. Sharf, 'Is Mindfulness Buddhist? (And Why It Matters)'. p. 470.
[11] Tamara Ditrich, 'Buddhism between Asia and Europe: The Concept of Mindfulness through a Historical Lens', *Asian Studies*, 4.1 (2016), 197–213 <https://doi.org/10.4312/as.2016.4.1.197-213>.

> As outlined well by McMahan, in the encounter with Christianity, particularly Protestantism in colonised Ceylon and Burma, Buddhism responded by: diminishing the traditionally central role of the *Saṅgha* and increased involvement and leadership from the laity, thus reflecting the anti-clericism of Protestantism; positioning the early Canonical texts as the source of "true" or "original" Buddhism while largely disregarding the living Buddhist traditions of the time; situating meditation at the very centre of Buddhism, perceiving it to be a private, subjective, individualised practise and experience, reflecting a Protestant aim for an individual to relate directly to and experience God without priestly intermediaries. [12]

The claim is that Insight Meditation was a simplification of traditional mindfulness meditation and became very popular: 'Insight meditation (*vipassanā*), which is largely founded on the practice of mindfulness thus became in Burma, and later on in other *Theravāda* Buddhist countries, a primary practise of modern Buddhism.'[13] Ditrich notes how, after 1970, insight (mindfulness) meditation became a new form of meditation and an international success:

> Meditation courses taught in the US and Europe were initially based on the Burmese methods of mindfulness practice, however, already at early stages they started to draw from and integrate other Buddhist traditions as well as non-Buddhist spiritual practices.[14]

There is a relationship between British colonialism and the 1970s mindfulness movement in the USA, and the early successes of the Insight movement probably helped the reception of medicalised meditation.

In addition to Insight Meditation, other forces were pushing and pulling meditation knowledge to the West, such as those linked to the Counter-culture.[15] Shruti Kapila recounts

[12] Ditrich. p. 7.
[13] Ditrich. p. 7.
[14] Ditrich. p. 8.
[15] Roszak offers multiple examples of the influence of Hindu and Buddhist knowledge on changing attitudes during the 1950s, particularly in his fourth chapter, 'Journey to the East . .. and Points Beyond: Allen Ginsberg and Alan Watts'. Theodore Roszak, *The Making of a Counter Culture: Reflections on the Technocratic Society and Its Youthful Opposition.* (Oakland: University of California Press, 1995). p. 124-154.

how psychiatry and psychoanalysis received very different receptions in India: 'During the colonial era, Indians rejected psychiatry altogether. Conversely, they were enchanted by psychoanalysis and psychology, intervening in their intellectual construction and also, significantly, bringing these disciplines into the public discourse of modernity.'[16] Kapila argues that biomedicine was never entirely accepted in colonial India, unlike pure or theoretical science. In addition to resistance to biomedicine, the scientific culture of colonial India retained a harmonious working relationship between belief and science. Kapila points out that science and religion in India were not dichotomous: 'One simple implication is that neither the divorce of God from man nor the death of God was necessary for the hegemony of science in India.'[17] We can see the same behaviours and concepts illustrated by Thomas's work in the last chapter; a dualistic affiliation to either belief or science did not limit Indian scientists in how it appears to have influenced Western scientists in the relocation of mindfulness.

It is an oversimplification to imagine India as a country without tensions between the traditional or modern, spiritual or scientific. Western scientists like Kabat-Zinn have presented the convergence of religion and psychology as fact. In contrast, Indian scholars are typically more interested in understanding the similarities and differences between religion and science. For example, Sudhir Kakar has investigated the relationship between medicine and the mystical in India for over two decades. In his 2003 analysis of psychoanalysis and Eastern spiritual healing traditions, he describes the differences between secular and spiritual behaviours:

> The meditative practices of the Eastern spiritual traditions are directed precisely towards the reduction of noise and glare produced by the sensual self. Thus although empathy is common to both spiritual healing and psychoanalytic cure, the concept itself veers towards its 'mystical' (in a non-pejorative sense) pole in the former case and towards its rational, intellectual pole in the latter.[18]

[16] Shruti Kapila, 'The Enchantment of Science in India', *ISIS*, 101.1 (2010), 120–32 <https://doi.org/10.1086/652700>. p. 125.
[17] Kapila. p. 24.
[18] Kakar, p. 674.

Kakar claims that 'rational' ways of understanding the mind originating in the West and religious knowledge developed in the East are not the same and have different social and personal significances. Sabah Siddiqui describes, in the Introduction to *Religion and Psychoanalysis in India: Critical Clinical Practice*, that India is still attempting to fix the institutional boundaries between traditional notions of faith and modern understandings of health:

> It is in this milieu of complicated relations to psyche and society that we must look at faith healing not only for its use but how it is caught up in multiple discourses and how it serves to function today at the site for the clash of global scientific advancement, Indian nationalist development and individual religious freedom.[19]

Kakar and Siddiqui ask questions about the nature of religion and science, which are rarely considered in the West, where dualistic ways of understanding the world may have led to the consideration that ontologically distinct knowledge systems could be combined.

There is evidence that ideas about mental health present in colonial and post-colonial India transferred to some Western industrialised societies in the middle decades of the twentieth century. However, the notion that knowledge systems could coexist appears to have been lost in this transition. Architects of the Counter-culture, such as Alan Watts, drew Eastern spiritual knowledge and Western psychotherapy into an informal alliance throughout the 1950s and 1960s. Watts wrote in 1961:

> The other way was to describe what I feel to be the most fruitful way in which Eastern and Western psychotherapies can fertilize one another. For not only have they much to learn from each other, but also it seems to me that the comparison brings out hidden and highly important aspects of both.[20]

[19] Sabah Siddiqui, *Religion and psychoanalysis in India: critical clinical practice*. (New York: Routledge, 2016). p. 2.
[20] Alan Watts, *Psychotherapy East and West* (Novato: New World Library, 1961). p. X.

Rather than accept the benefits of Eastern and Western knowledge in their own ontological frameworks, Watts is following the trajectory of Carus, later adopted by Wallace and Kabat-Zinn, advocating for a fusion of two systems into one.

In comparing the impact of two leading advocates for Zen Buddhism in the West (Suzuki and Watts), Theodore Roszak illustrates in *The Making of a Counter Culture: Reflections on the Technocratic Society and Its Youthful Opposition,* attempts to align Eastern and Western approaches to mind: 'Of the two, I think it is Watts whose influence has been the more widespread, for often of risking vulgarization, he has made the most determined effort to translate the insights of Zen and Taoism into the language of Western science and psychology.'[21] A fuller discussion of the role of the Counter-culture in drawing Eastern religious knowledge to the West is beyond the scope of this thesis, but Paul Oliver explores many of the elements in his book *Hinduism and the 1960s* [22]

Having established that Eastern belief-based knowledge circulated West, a second stage, the relocation of that knowledge into scientific domains, also requires consideration. In discussing developments of Basalla's classic diffusion model to explain the migration of science, Dhruv Raina argues for the importance of 'cultural reception' in science creation in the study, 'From West to Non-west? Basalla's Three-stage Model Revisited'.[23] Raina contends that science requires a wider acceptance of its agenda for success, arguing, 'The alternative approaches, on the other hand, analyze the process of 'cultural reception', addressing concerns such as the legitimation of science in different cultural spaces, the dialogue and confrontation

[21] Roszak, *The Making of a Counter Culture: Reflections on the Technocratic Society and Its Youthful Opposition.* p. 132.
[22] Paul Oliver, *Hinduism and the 1960s* (London: Bloomsbury Academic, 2014).
[23] Dhruv Raina, 'From West to Non-west? Basalla's Three-stage Model Revisited', *Science as Culture,* 8.4 (1999), 497–516 <https://doi.org/10.1080/09505439909526560>.

between different knowledge systems'.[24] The notion of cultural reception suggests that discourses in wider society supported the transition of meditation to scientific domains. The movement of Eastern spiritual ideas in the West in the 1950s and 1960s coincided with or was linked to a growing trend towards holistic medicine, where the infallibility of doctors was questioned. Mike Saks points out this revision to orthodoxy in his history of medicine in the Counter-culture: 'This challenge went hand in hand with other attacks on high technology medicine, as dehumanising the patient, for being less technically effective than commonly supposed, and for creating iatrogenic illness.'[25] In this light, discourses in the Counter-culture, including the convergence of Zen Buddhism and psychotherapy by Fromm and Suzuki, appear as part of a process that 'legitimised' the medicalisation of Eastern belief-based knowledge.[26] Roszak confirms a connection between religion and a rejection of purely technological imaginaries of people and health in Counter-culture thinking: 'But we may have been decidedly wrong in what we long expected to follow the death of the Christian God; namely, a thoroughly secularized, thoroughly positivistic culture, dismal and spiritless in its obsession with technological prowess.'[27] However, the tendency in the Counter-culture was to seek alignment or fusion between religion and science and to not value both systems on their own merits. Rather than testing the reliability of Roszak's claim, my main point is that these ideas were in circulation when the science of meditation was in its formative stages.

[24] Raina provides an explanation and analysis of Basalla's original work. Raina. p. 511.
[25] Saks, 'Medicine and the Counter Culture'. p. 116.
[26] Fromm, 'Psychoanalysis and Zen Buddhism'.
[27] Roszak, *The Making of a Counter Culture: Reflections on the Technocratic Society and Its Youthful Opposition.* p. 138.

3. The Relocation and Acceptance of Traditional Eastern Knowledge in the West

The circulation of belief-based knowledge and its cultural acceptance in the West extended beyond the Counter-culture. Meditation and yoga techniques were in migration long before the Western political and cultural turmoils of the 1960s led to their wider acceptance. Robert Sharf links MBSR with Insight Meditation, a tradition originating in the early 1900s.[28] In common with meditation, yoga also went through processes of Westernisation before being embraced as a wellbeing practice. When visiting the World Parliament of Religions in 1893 in Chicago, the Western-educated Swami Vivekananda introduced American academics and practitioners to his modern insights of Raja Yoga.[29] Vivekananda explained yoga in a form sympathetic to scientific worldviews. Elizabeth De Michelis describes how significant the influence of this modernised version was to the future of yoga in the West: 'One of the direct results of this venture was the meteoric success of Swami Vivekananda, who virtually overnight became a popular icon of 'spirituality' in Asia, America, and Europe.'[30]

Any notion that Western scientists, clinicians and scholars were solely responsible for appropriating Eastern spiritual practices is not supported when a long view of these relocations is taken. De Michelis contends the relationship between Vivekananda and William James impacted both psychology and religion, supporting a model of knowledge circulation rather than diffusion: 'Thus the Swami joins the intellectual current of secularization which was shaping the forms and language of the psychologization of religion. One of the central

[28] Sharf, 'Is Mindfulness Buddhist? (And Why It Matters)'. p. 470.
[29] Norris Frederick, 'William James and Swami Vivekananda: Religious Experience and Vedanta/Yoga in America', *William James Studies*, 9 (2012), 37-55.
[30] Elizabeth De Michelis, *A History of Modern Yoga: Patañjali and Western Esotericism* (London: Continuum, 2004). p. 316.

exponents of this current was James.'[31] As a third example of Eastern knowledge migration, we can also briefly consider the medicalisation of acupuncture in the same frame as meditation and yoga. Western health practitioners have been profitably engaging with acupuncture since the end of the 17th century.[32] In his discussion of the relocated form of traditional acupuncture, Western Medical Acupuncture (WMA), Adrian White notes: 'The current surge of interest in the scientific approach to acupuncture owes much to an influential, medically trained acupuncture teacher, Felix Mann, who declared in the 1970s: 'Acupuncture points and meridians, in the traditional sense, do not exist.'[33] From these accounts, meditation, yoga, and acupuncture appear to have been adapted or translated by adherents to make them accessible to scientific enquiry as part of the relocation and acceptance processes. Bio-medical communities seem to have problems engaging with non-scientific knowledge and methods unless converted or translated to familiar concepts. A concrete sign of a growing convergence of Eastern spiritual concepts within Western medical contexts was the development of Zen Psychotherapy by Fromm and Suzuki in the late 1950s.[34] At an academic workshop in Cuernavaca, Mexico, in 1957, Fromm and Suzuki announced their intention to use Zen Buddhism to develop new approaches to psychotherapy.

4. Fromm, Suzuki, and the Union of Buddhism and Psychotherapy

Drawing Buddhist and Hindu knowledge into Western medico-scientific domains was neither quick nor simple. The integration of Zen with psychotherapy was built on more than

[31] De Michelis. p. 172.
[32] Roberta Bivins, 'The Needle and the Lancet: Acupuncture in Britain, 1683–2000', *Acupuncture in Medicine*, 19.1 (2001), 2–14 <https://doi.org/10.1136/aim.19.1.2>.
[33] White, 'Western Medical Acupuncture: A Definition.' p. 33.
[34] I am directly linking back to Raina's discussion about relocation here, see Kabat-Zinn, 'An Outpatient Program in Behavioural Medicine for Chronic Pain Patients Based on the Practice of Mindfulness Meditation: Theoretical Considerations and Preliminary Results'. For details of Zen Psychotherapy see Fromm, 'Psychoanalysis and Zen Buddhism'.

fifty years of activity. For example, a Japanese therapist, Dr Morita, used Zen concepts in a clinical setting in 1919.[35] At the time of the Cuernavaca workshop, Suzuki was 87 and had been writing about and teaching Zen to Westerners for decades. In some sense, the Zen Psychotherapy project was the culmination of his attempts to bring Zen to the West.[36] Suzuki moved from Japan to the USA between 1897 and 1908 to work for Paul Carus. A brief description of the relationship between Carus and Suzuki offers some context for Suzuki's later work and his role in the medicalisation of Zen concepts. After immigrating from Germany to the USA in 1884, Carus embarked on a writing and publishing career. He was committed to promoting the idea of a RoS, a monistic philosophy that claimed congruence between some spiritual and scientific traditions.[37] According to Donald Meyer, Carus: 'believed that truth was one, that science was the search for truth, and therefore that religion must be based on science.'[38] The Buddhist scholar Sharf argues that Suzuki's presentation of Zen in the West was likely influenced by the ideas of Carus and his Western-style university education in Tokyo.[39] This relationship further indicates that the relocation of Buddhist knowledge was built on the agendas of protagonists from the East and West, often working in concert. Carl Jackson described Carus's significant influence on Suzuki's trajectory: 'If Suzuki's work has been one of the most important bridges to the West's modern understanding of Buddhism, Carus must be accounted one of the chief engineers.'[40] So perhaps Suzuki was an ideal partner for Fromm's project to combine Zen and psychotherapy, or vice versa?

[35] Kenji Kitanishi and Atsuyoshi Mori, 'Morita Therapy: 1919 to 1995', *Psychiatry and Clinical Neurosciences*, 49.5–6 (1995), 245–54 <https://doi.org/10.1111/j.1440-1819.1995.tb01896.x>.
[36] For the background of Suzuki's role in the relocation of Zen see Robert Sharf.
[37] For details of Carus's early life and the philosophical influences, see Meyer, 'Paul Carus and the Religion of Science'.
[38] Meyer, 'Paul Carus and the Religion of Science'. p. 601.
[39] Robert Sharf.
[40] Carl T. Jackson, 'The Meeting of East and West: The Case of Paul Carus', *Journal of the History of Ideas*, 29.1 (1968), 73 <https://doi.org/10.2307/2708466>. p. 90.

At the time of Cuernavaca, Suzuki was well known in the West; for example, Carl Gustav Jung wrote the foreword to his 1934 book *Introduction to Zen Buddhism*.[41] The workshop, held under the auspices of the Autonomous National University of Mexico, represented a formal bridge between Buddhism and psychology.[42] Fromm made it clear that Zen Psychotherapy was a convergence of positivism and belief, careful to position psychotherapy as part of the scientific family: 'Psychoanalysis is a scientific method, nonreligious to its core'.[43] Fromm's account of the workshop demonstrates confidence in the compatibility of the belief-based concepts of Zen with a scientific worldview:

> Zen Buddhism helps man to find an answer to the question of his existence, an answer which is essentially the same as that given in the Judaeo-Christian tradition, and yet which does not contradict the rationality, realism, and independence which are modern man's precious achievements.[44]

Anne Harrington's review of the influence of Zen on psychotherapy claims that Fromm was convinced that Zen could help psychoanalysts address the challenges of human existence. 'In the years since then—mostly on the strength of reading Suzuki's work—he had become convinced that Zen Buddhism offered a worldview more consistent with true freedom than any other religion he knew.'[45]

Although Zen Psychotherapy never became widely available, it was an influential stage in the development of Western therapy. Alan Roland describes it as a spiritual 'fork' in the evolution of post-Freudian psychoanalysis: 'This was the first attempt by a major

[41] Daisetz Teitaro Suzuki, *An Introduction to Zen Buddhism* (New York: Grove Press, 1991).
[42] Fromm, *Psychoanalysis and Zen Buddhism*.
[43] Fromm, *Psychoanalysis and Zen Buddhism*. p. 79.
[44] Fromm, *Psychoanalysis and Zen Buddhism*. p. 81.
[45] Anne Harrington, 'Zen, Suzuki and the Art of Psychotherapy', 2016, 56–77 <https://doi.org/10.4324/9781315659831-7>. p. 6.

psychoanalyst to bring together psychoanalysis and one of the Eastern spiritual traditions.'[46] The partnership can also be seen as a catalyst for the conceptual engagement of science and belief. From the perspective of MBSR, Kabat-Zinn cited Suzuki's writing in his mindfulness studies.[47] Zen Psychotherapy was a significant turning point in the convergence of science and religious practices; it made a formal case of synergy between Zen and psychology. In addition, it was fuelled by and helped sustain the agenda of the Counter-culture, which was sympathetic to Eastern spiritual practices and concepts. Zen Psychotherapy also illustrates the tendency to attempt to create a singular understanding of mind and matter from a fusion of Western and Eastern knowledge. Finally, but crucially for medicalised meditation, Fromm positioned Buddhist concepts as powerful clinical tools when integrated into medico-scientific domains.

5. The Foundations of the Science of Meditation

Two entangled strands in this history are the traditional scientific study of meditation and the medicalised scientific approaches, which first appeared in the literature in 1970. The traditional investigation of meditation began in the 1930s and continues to this day; it takes a positivist perspective. Medicalised meditation, as defined in the Introduction, became the dominant form of meditation research during the 1970s and has also endured to some extent within MBSR and MBI research. Reliable scientific investigations from the 1960s, such as Akira Kasamatsu and Tomio Hirai's 1966 paper, 'An Electrocephenolographic Study on the Zen Meditation' (Zazen), drew on non-positivist concepts without narrowing the boundaries between belief and science:

[46] Alan Roland, 'Erich Fromm's Involvement with Zen Buddhism: Psychoanalysts and the Spiritual Quest in Subsequent Decades', *Psychoanalytic Review*, 104.4 (2017), 503–22 <https://doi.org/10.1521/prev.2017.104.4.503>.
[47] Kabat-Zinn, 'An Outpatient Program in Behavioural Medicine for Chronic Pain Patients Based on the Practice of Mindfulness Meditation: Theoretical Considerations and Preliminary Results'. p. 34.

> This mental state (Satori or enlightenment) will often be misunderstood as trance or hypnosis. It is said that Satori is not an abnormal mental state but one's everyday mind in the Zen sense. Dr. Erich Fromm describes "If we would try to express enlightenment in psychological terms, I would say that it is a state in which the person is completely tuned to the reality outside and inside of him, a state in which he is fully aware of it and fully grasps it".[48]

The reference to Fromm here indicates a consideration of the plausibility of spiritual goals and practices that is visible in several Japanese studies from the 1960s. This statement is perhaps a demonstration of the status of Zen Buddhism within Japanese society, but also the acceptance or coexistence of two different approaches to human consciousness.

The early scientific studies of meditation were foundational; they made significant progress in understanding the effects of meditation on practitioners, but relatively few, likely less than 20, were published before 1970. There are indications that more published research may exist in non-digital forms. Deane Shapiro and Roger Walsh's 1984 review, *Meditation: Classic and Contemporary Perspectives,* provides reviews of several early scientific meditation studies.[49] I am also indebted to Beverly Timmons and Joe Kamiya for their bibliography of meditation research published in January 1970.[50] Researchers may be interested that Timmons and Kamiya list several works absent from other accounts from an international range of journals such as *Confina Psychiatrica, Egyptian Journal of Psychology, Gazette Medicale de France, Indian Journal of Medical Research, Indian Journal of Psychoanalytic Studies, Indian Journal of Parapsychology, Psyche, Psychologia* and the *Rassegna Italiana di Ricerca Psichica*.

[48] Akira Kasamatsu and Tomio Hirai, 'An Electrocephenolographic Study on the Zen Meditation (Zazen)'.
[49] Deane Shapiro and Roger Walsh, *Meditation: Classic and Contemporary Perspectives* (New York: Aldine Publishing Company, 1984).
[50] Beverly Timmons and Joe Kamiya, 'The Psychology and Physiology of Meditation and Related Phenomena: A Bibliography', *The Journal of Transpersonal Psychology*, 2, (no. 1).41. (1970).

One frequent omission from the meditation literature from the first half of the 20th century is the scientific consideration of Autogenic Training (AT), a secular mind-training practice used in clinical settings.[51] Developed in 1920 by psychiatrist Johannes Heinrich Schultz, Wolfgang Luthe described the system in 1963: 'Autogenic Training is a psychophysiologic form of psychotherapy which the patient carries out by himself by using passive concentration upon certain combinations of psychophysiologically adapted stimuli.'[52] Although AT has some characteristics of meditation, it has not played a meaningful part in its systematic study or consideration of theoretical frameworks. From a scientific perspective, the lack of comparative analysis between belief-based meditation and AT may have been a missed opportunity.

Establishing precise dates for the beginning of the scientific study of meditation is problematic. Western psychotherapeutic and psychological discussions of meditation can be traced to the end of the nineteenth century. In William James's seminal work *The Varieties of Religious Experience*, published in 1918, the pioneering psychologist discussed (in terms surprisingly familiar to contemporary meditation scientists) Western Christian meditation:

> Finally, mind-cure has made what in our protestant countries is an unprecedentedly great use of the subconscious life. To their reasoned advice and dogmatic assertion, its founders have added systematic exercise in passive relaxation, concentration, and meditation, and have even invoked something like hypnotic practice.[53]

As with an apparent reluctance to investigate AT, the lack of interest by meditation scientists in Western forms of belief-based meditation is an anomaly worthy of further investigation.

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[51] W. Luthe, 'Autogenic Training: Method, Research and Application in Medicine', *American Journal of Psychotherapy*, 17.2 (1963), 174–95 <https://doi.org/10.1176/appi.psychotherapy.1963.17.2.174>. p. 174.
[52] Luthe.
[53] The publication was a record of James's Gifford Lectures on natural religion delivered at Edinburgh in 1901 and 1902. Williams James, *The Varieties of Religious Experience* (New York: Longmans, Green, And Co, 1917), p. 547 <https://www.gutenberg.org/ebooks/621>[accessed 24 October 2023].

The first references to experimental investigations of meditation appeared during the 1930s. In his 1975 review, 'Meditation as Psychotherapy: A Review of the Literature', Jonathan Smith quotes from a 1936 B. K. Bagchi study that signposts early clinical and perhaps neurological evidence for the benefits of meditation: 'At present we can only point to clinical cases as a practical counter-argument, waiting for further neurological evidence to support our belief.'[54] In his PhD dissertation, Robert Wallace stated that the French cardiologist Therese Brosse systematically studied the physiological effects of meditation in 1935.[55] However, I have found no reference to experimental data before 1930.

The first reported experimental results identified that link meditation to the brain's electrical activity are in Walter's 1938 review.[56] This account offers a robust case for a formal beginning of the scientific history of meditation. This is not only because it documents one of the oldest accounts of a meditation experiment but also because Walter's early use of EEG technology and his findings appear to offer theoretical and methodological trajectories that are still relevant today. In his survey 'Critical Review: The Technique and Application of Electro-Encephalaography', published in the *Journal of Neurology, Neurosurgery & Psychiatry*, Walter discusses how different conscious states such as sleep and meditation (auto-hypnosis) correlate with electrical activity in the brain:

> In auto-hypnosis as practised in certain Eastern cults the author has found that the alpha rhythm may be considerably increased in size and persistence. Records taken from an Indian engaged in meditative abstraction showed an almost continuous train of normal alpha waves, which were very resistant to inhibition by external stimuli, though in the same subject shutting the eyes without meditation produced a normally irregular discharge. [57]

[54] Jonathan C. Smith, 'Meditation as Psychotherapy: A Review of the Literature', *Psychological Bulletin*, 82.4 (1975), 558–64 <https://doi.org/10.1037/h0076888>. p.562.
[55] Robert Keith Wallace, 'The Physiological Effects of Transcendental Meditation: A Proposed Fourth Major State of Consciousness' (unpublished Ph.D., University of California, Los Angeles, 1970) <https://www.proquest.com/docview/302498478/citation/99CC6438A83447CDPQ/1> [accessed 24 October 2023]. p. 5.
[56] Walter, p. 373.
[57] Walter. p. 373.

Although this short explanation offered no empirical data, it describes two essential findings. First, meditation appeared to increase the 'size and persistence' of the alpha waves in the brain, and second, resistance to inhibition of those alpha waves (alpha-blocking) through distraction.[58] Walter notes that these readings differed from the results when the participants closed their eyes. To illustrate the significance of these early findings and in preparation for further discussions, I will introduce the relevant EEG technology and the importance of brain waves in the scientific study of meditation.

6. Meditation, EEGs and Brain Waves

Alpha waves, in particular, and brain waves generally represent foundational knowledge in the scientific understanding of the effects of meditation. Belinda Ivanovski and Gin Malhi have described their ongoing value in their investigation of meditation and mindfulness.[59]

> Electroencephalography research suggests increased alpha, theta and beta activity in frontal and posterior regions, some gamma band effects, with theta activity strongly related to level of experience of meditation; however, these findings have not been consistent. The few neuroimaging studies that have been conducted suggest volumetric and functional change in key brain regions. [60]

[58] Alpha waves are typically observed when participants are relaxed with their eyes closed. However, when the eyes are opened or external distractions such as noise are experienced, the alpha state typically attenuates, usually towards the default beta state. Thus, Walter is demonstrating, for the first time, that meditators appear to have resistance to alpha blocking. For a review of the preliminary research into alpha-blocking, see Michael West, 'Meditation and the EEG', *Psychological Medicine*, 10.2 (1980), 369–75 <https://doi.org/10.1017/S0033291700044147>. p. 369.

[59] Ivanovski and Gin Malhi, 'The Psychological and Neurophysiological Concomitants of Mindfulness Forms of Meditation', *Acta Neuropsychiatrica*, 19.2 (2007), 76–91 <https://doi.org/10.1111/j.1601-5215.2007.00175.x>[accessed 24 October 2023].

[60] Ivanovski and Malhi. p. 76.

Despite increasing dependence on self-reported data in medicalised meditation research, brain wave data plays an important role in this scientific history.

Scientists have long observed the presence of electrical activity in the brains of animals. In 1875, Richard Caton published the results of his experiments, where he used a galvanometer to evidence electrical activity in the exposed brains of mammals.[61] However, it was not until Hans Berger developed the EEG in 1924 that scientists could systematically measure electrical activity in the human brain.[62] The EEG represents a landmark in the scientific and clinical understanding of brain function and structure, and it remains an essential experimental and diagnostic tool.

Brainwaves, also known as neural oscillations, are patterns of electrical activity in the brains of mammals. Neural tissue has intrinsic electrical properties and can generate oscillatory activity, both at the level of individual neurons and in concert within clusters of cells.[63] The 'column' architecture of the brain means that groups of tightly packed neurones are adjacent and perpendicular to the skull.[64] When oscillations occur in concert in these 'columns', they become detectable with EEG technology. Sensors placed on a person's head can record voltage changes in ionic current in the brain's cortical regions closest to the scalp. EEG recordings of electrical activity rely on the collective performance of large numbers of cells: 'Each scalp electrode detects the electrocellular activity of about a billion cortical neurons.'[65] EEG recordings capture only a tiny part of the actual electrical activity occurring in the brain; this

[61] Richard Caton, 'Electrical Currents of the Brain', *The Journal of Nervous and Mental Disease*, 2.4 (1875), 610.
[62] Rümeysa İnce, Saliha Seda Adanır, and Fatma Sevmez, 'The Inventor of Electroencephalography (EEG): Hans Berger (1873–1941)', *Child's Nervous System*, 2020 <https://doi.org/10.1007/s00381-020-04564-z>.
[63] Rodolfo R. Llinás, 'Intrinsic Electrical Properties of Mammalian Neurons and CNS Function: A Historical Perspective', *Frontiers in Cellular Neuroscience*, 8 (2014), 320 <https://doi.org/10.3389/fncel.2014.00320>.
[64] David A. Kaiser, 'Basic Principles of Quantitative EEG', *Journal of Adult Development*, 12.2–3 (2005), 99–104 <https://doi.org/10.1007/s10804-005-7025-9>. p. 99
[65] Kaiser. p. 99

data is ‘noisy’ and has to be processed to remove spurious signals and anomalies before it is useable.

The output of EEG recordings illustrates patterns (waves) of different frequencies and power. In Michael Teplan’s overview of how EEG data relates to brain wave classification, he explains that ‘Brain patterns form wave shapes that are commonly sinusoidal. Usually, they are measured from peak to peak and normally range from 0.5 to 100 μV (microvolts) in amplitude.’[66] ‘Sinusoidal’ refers to the sine wave shape of the brain wave when presented in a two-dimensional form. Teplan points out that this spectrum of brain waves is continuous, and ‘the brain state of the individual may make certain frequencies more dominant.’ So, by identifying novel patterns in the brain waves of meditators, scientists can create hypotheses for the direct and indirect effects of meditation on the brain and behaviour.

Most scientists categorise brain waves into five primary groups based on the frequency of band waves (Table 1).[67] Each group of waves correlates with generalised mental states. Scientific understandings of the band categorisation and the correlated mental states are still developing. But in 2006, a systematic review of EEG experiments in meditation research by Rael Cahn and John Polich consolidated the claims that alpha and theta waves were those typically mediated by meditative states: ‘It is difficult to draw specific inferences from these studies other than the fact that theta and alpha band activity seems affected by meditation (state), which may alter the long-term neuroelectric profile (trait).’[68] As more meditation research was undertaken, the range of physiological changes observed during meditation increased, and different meditation practices appeared to produce distinct states and traits. Save

[66] See Michael Teplan, ‘Fundamentals of EEG Measurement’, *Measurement Science Review*, 2 (2002), 1–11. p. 2.
[67] Both the categorisations and state descriptions are based on Decho Surangsrirat and Apichart Intarapanich, ‘Analysis of the Meditation Brainwave from Consumer EEG Device’, in *SoutheastCon 2015*, 2015, pp. 1–6 <https://doi.org/10.1109/SECON.2015.7133005>.
[68] Rael Cahn and John Polich, ‘Meditation States and Traits: EEG, ERP, and Neuroimaging Studies’, *Psychological Bulletin*, 132.2 (2006), 180–211 <https://doi.org/10.1037/0033-2909.132.2.180>.

for increased alpha activity and unique relationships with alpha-blocking, which tended to be ubiquitous.[69] These generalised explanations are a necessary over-simplification; however, they reflect key trends in meditation research from Walter's initial work through to the 1970s.

Name	Frequency of band wave (Hz)	Typical characteristics of the correlated mental states
delta δ	Less than 4	Delta waves are the slowest (lowest frequency) and strongest brain waves. Usually observed during deep or dreamless sleep and occasionally found in deep meditative states.
theta θ	4-8	Drowsiness or light sleep, theta waves are also seen in deep relaxation or meditation states.
alpha α	8-12	Seen in relaxed, calm mental states with eyes closed in most forms of meditation with eyes open and closed.
beta β	12-30	Standard (default) waking consciousness, large-scale brain activities such as memory and attention.
gamma γ	More than 30	Gamma waves are usually recorded during information processing from different areas, such as learning and spatial navigation.

Table 1. Brain wave distribution by frequency of wave.[70]

7. Understanding Meditative States: Research Between 1955 and 1969

Despite their pioneering nature, Walter's claims of a relationship between meditation and altered brain states have attracted little attention. They could even be considered a false scientific start.[71] Today, historical accounts of meditation frequently begin in the 1950s. For example, Antoine Lutz, John Dunne and Richard Davidson describe the beginning of the science of meditation in 'Meditation and the Neuroscience of Consciousness: An Introduction' as: 'Historically, the first studies took place in Asia in the 1950s with advanced yogic

[69] Cahn and Polich.
[70] Based on data in the paper by Surangsrirat and Intarapanich.
[71] For more details about Walter's life and work see W. J. Freeman, 'W.G. Walter: The Living Brain', in *Brain Theory*, ed. by Günther Palm and Ad Aertsen (Berlin, Heidelberg: Springer, 1986), pp. 237–38 <https://doi.org/10.1007/978-3-642-70911-1_17>.

practitioners in India.'[72] This statement refers to N. Das and Henri Gastaut's neurophysiological investigation from 1955.[73] Das and Gastaut undertook field experiments on seven experienced (advanced) practitioners of Kriya meditation, an ancient Hindu method popularised in the West in the 1940s by Paramhansa Yogananda.[74] Das and Gastaut combined EEG data with other physiological metrics, such as heart measurements, to give insight into the brain-body effects of meditation.

In their 2006 review of EEG research, Cahn and Polich summarised Das and Gastaut's results: 'alpha activity decrease, frequency increase; Samadhi with increased amplitude fast beta activity; no alpha blocking to stimuli; resting alpha with increased amplitude and wider distribution after meditation vs. before.'[75] The term '*Samadh*i' here refers to deep meditation states. In this study, the subjectively observed *Samadhi* was linked to beta wave activity. Das and Gastaut also reported increased heart rate and skin conductance during meditation.[76] Skin conductance, also known as electrodermal response, measures how well human skin conducts electricity.[77] Generally speaking, relaxed states tend to produce lower skin conductance than aroused states.

[72] N Das and Henri Gastaut, 'Variations in the Electrical Activity of the Brain, Heart, and Skeletal Muscles during Yogic Meditation and Trance', *Electroencephalography and Clinical Neurophysiology*, 6 (1955), 211-219.
[73] Das and Gastaut.
[74] Paramhansa Yogananda, *Autobiography of a Yogi: The Original 1946 Edition plus Bonus Material* (Crystal Clarity Publishers, 2005).
[75] I have drawn on Cahn and Polich's summaries of experimental findings to support my analysis of scientific progress because of their strategic overview of EEG studies and attempts at the standardisation of claims in such a complex and fragmented discipline. Cahn and Polich. p. 183.
[76] For a full discussion of this aspect of meditation research, see Yi-Yuan Tang and others, 'Central and Autonomic Nervous System Interaction Is Altered by Short-Term Meditation', *Proceedings of the National Academy of Sciences*, 106.22 (2009), 8865–70 <https://doi.org/10.1073/pnas.0904031106>. For discussion of the Das and Gastaut results, see Antoine Lutz, John D. Dunne, and Richard J. Davidson, 'Meditation and the Neuroscience of Consciousness: An Introduction', in *The Cambridge Handbook of Consciousness* (New York, NY, US: Cambridge University Press, 2007), pp. 499–551 <https://doi.org/10.1017/CBO9780511816789.020>. p. 536.
[77] Antonette Scavone, Marta J. Kadziolka, and Carlin J. Miller, 'State and Trait Mindfulness as Predictors of Skin Conductance Response to Stress', *Applied Psychophysiology and Biofeedback*, 45.3 (2020), 221–28 <https://doi.org/10.1007/s10484-020-09467-y>.

Das and Gastaut's findings are interesting because they detected beta waves and increased heart rate and skin conductance, indicators now assumed to be negatively correlated with meditative states, suggesting something unusual. Further important data from this study was the persistence of altered alpha waves in the post-meditative state. As changes to the alpha activity did not stop when the meditation ended, it suggests a longer-term effect resulting from regular meditation. Caution is required when generalising the results of this field study undertaken in less-than-perfect experimental conditions. However, even from this preliminary perspective, there is evidence that meditation could bring short- and possibly long-term changes to the brain and body. Gastaut's prominence as a leading French neurologist and an epileptologist (an epilepsy specialist) of global importance may have been a factor in eventually drawing meditation research into the scientific mainstream.[78] However, there was limited scientific interest in the second half of the 1950s.

During the 1960s, scientific engagement with meditation gathered momentum both in the West and Asia. The post-war increase in the interest in psychology, combined with the influence of the Counter-culture, may have supported this growth. West wrote that findings from a preliminary experiment were presented at a Marseille University conference by Peter Fenwick in 1960.[79] According to West, 'Fenwick's subjects were Westerners who had been taught a technique of mantra meditation (almost identical to Transcendental Meditation or 'TM').'[80] This experiment is one of the first documented investigations of the effects of meditation on Western practitioners of Eastern methods, the start of an enduring trend. West claims that Fenwick confirmed the presence of both alpha and theta waves during meditation for the first time, 'The records of 3 subjects were analysed, and the author reported an increase

[78] Gastaut described several epileptic conditions for the first time using EEG as his primary diagnostic tool. For more information see Charlotte Dravet and Joseph Roger, 'Henri Gastaut 1915-1995', *Epilepsia*, 37.4 (1996), 410–15 <https://doi.org/10.1111/j.1528-1157.1996.tb00580.x>.
[79] West, 'Meditation and the EEG'. p. 369.
[80] West, 'Meditation and the EEG'. p. 369.

in amplitude of alpha at the beginning of meditation, accompanied later in meditation by bursts of theta.'[81] Theta waves are a lower band than alpha and suggest deeper forms of meditation or relaxation.

In 1961, three scientists working at the All-India Institute of Medical Sciences, New Delhi, Bal Krishan Anand, Gulzar Singh Chhina, and Baldev Singh, recorded increased alpha frequency and no alpha-blocking in yogic meditators: 'It was observed that their resting records showed persistent alpha activity with increased amplitude modulation during samadhi. The alpha activity could not be blocked by various sensory stimuli during meditation.'[82] However, significant alpha activity was also recorded during rest (while not meditating), suggesting meditation's trait (long-term) effects. The low number of participants in these early experiments (Das and Gastaut - seven, Fenwick - three, Anand, Chhina and Singh - six) made generalisations problematic. Nonetheless, the increased alpha activity and changes to alpha-blocking appeared to be consistent. In 1966, Akira Kasamatsu and Tomio Hirai conducted experiments with Zen meditators from the Japanese Soto and Rinzai sects (Figure 6).[83] According to West, their work reflected a more methodologically robust approach than earlier research: 'In another careful study, Kasamatsu and Hirai selected 48 priests and disciples from the Soto and Rinzai sects in Japan, with meditation experience ranging from one to more than twenty years.' [84] These experiments examined the largest number of meditators yet studied and used a control group of twenty-two participants (non-meditators against which to evaluate the effects of meditation practice). The size and diversity of this group of meditators enabled

[81] West, 'Meditation and the EEG'. p. 369.
[82] Bal Krishan Anand, Gulzar Singh Chhina, and Baldev Singh, 'Some Aspects of Electroencephalographic Studies in Yogis', *Electroencephalography and Clinical Neurophysiology*, 13.3 (1961), 452–56 <https://doi.org/10.1016/0013-4694(61)90015-3>.
[83] Kasamatsu and Hirai, *'An Electrocephenolographic Study on the Zen Meditation (Zazen)*'.
[84] Michael West, 'Meditation.', *The British Journal of Psychiatry : The Journal of Mental Science*, 135.5 (1979), 457–67 <https://doi.org/10.1192/bjp.135.5.457>. p. 459.

Kasamatsu and Hirai to break their experimental results down based on meditation experience, providing a new richness of insights:

> These alpha waves increase amplitude and decrease frequency with the progress of Zen meditation. And sometimes, the rhythmical theta train appears in the later stages of the meditation. These findings are also parallel with the degree of Zen disciples' mental states in the Zen sense and their years spent in Zen training.[85]

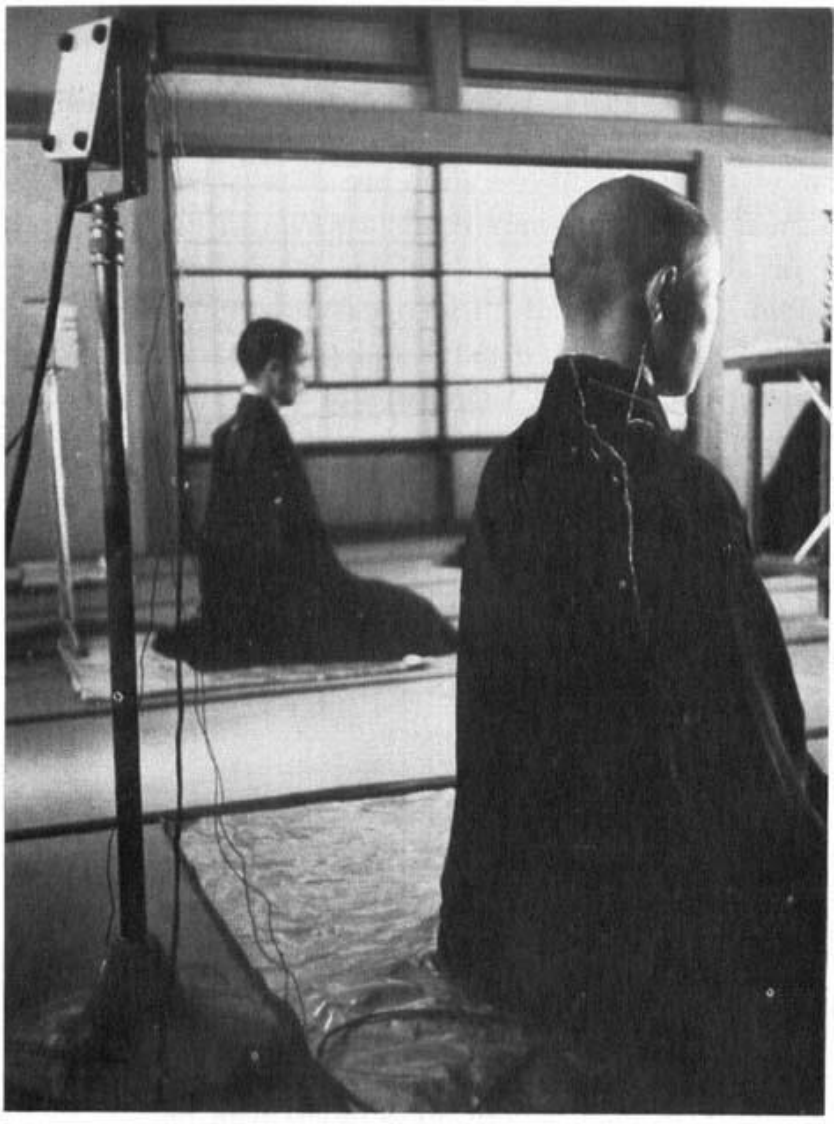

Fig. 6. An image from Kasamatsu and Hirai's 1966 paper. 'EEGs were continuously taken before, during and after Zen meditation of the Zen priests and disciples at their Zen training hall (Zendo). The photograph shows the disciples with the recording electrodes, practising Zen meditation.'[86]

[85] Kasamatsu and Hirai, *'An Electrocephenolographic Study on the Zen Meditation (Zazen)'*. p. 331.
[86] Kasamatsu and Hirai, 'An Electrocephenolographic Study on the Zen Meditation (Zazen)'. p. 317.

We see for the first time, EEG evidence of a progressive effect of meditation practice. West summarised these new insights as establishing 'a direct relationship between the length of time their subjects had practised meditation and the nature of the EEG changes during meditation.'[87] Kasamatsu and Hirai also claimed the theta state of the Zen practitioners had an EEG pattern distinct from normal sleepiness: 'the level of the cerebral excitatory state is gradually lowered in a way that is different from sleep.'[88]

One final technical but important finding emphasised by Kasamatsu and Hirai was a lack of alpha-blocking habituation among experienced meditators. Until this point, scientists had generally found that meditators were resistant to alpha-blocking. While meditating, even with eyes open, increased alpha wave amplitude was not interrupted by distractions, such as deliberately generated noises. In this experiment, Zen priests did experience alpha-blocking but without habituation. For example, when control participants were relaxed with their eyes closed, alpha-blocking was observed in response to distraction. Over time, the control participants became habituated, and alpha-blocking declined. In the Zen meditators, alpha-blocking remained consistent; there was no habituation. This finding further confirmed that meditation created unusual states of consciousness:

> These findings are also supported by the introspection of our subjects in this experiment. The Zen masters reported to us that they had more clearly perceived each stimulus than in their ordinary awakening state. In this state of mind one cannot be affected by either external or internal stimulus, nevertheless, he is able to respond to it. He perceives the objects, responds to it and yet is never disturbed by it.[89]

[87] Cahn and Polich. p. 187.
[88] Kasamatsu and Hirai, 'An Electrocephenolographic Study on the Zen Meditation (Zazen)'. p. 332.
[89] Kasamatsu and Hirai, 'An Electrocephenolographic Study on the Zen Meditation (Zazen)'. p. 334.

Compared to early findings, this research confirmed a lack of uniformity in how different meditation methods could influence mental states, making wider generalisations about 'meditation' problematic.

Kasamatsu and Hirai's commitment to a positivist approach did not stop them from commenting on Zen concepts of mind. For example, they made sense of their data by relating it to Zen descriptions of mental training: 'These findings are also parallel with the degree of Zen disciples' mental states in the Zen sense'.[90] Also, in drawing on the work of Fromm and Suzuki, they offered explanations for the conscious/unconscious states available through Zen meditations: 'Rather "the unconscious" in Zen is closely related to the unconscious which, stated by Jung, C. G."' or Fromm, E."'[91] In regard to this problem Dr. Daisetsu Suzuki states the meaning of it as "the Cosmic unconscious"'. The belief-based concepts within this scientific investigation confirm a degree of flexibility in the boundaries between different world views in this time and place, which did not limit the scientific approach. Unlike the medicalised methods that emerged during the 1970s, Kasamatsu and Hirai illustrated a largely scientific interest in meditation, although they saw its potential clinical benefits. In the text for their 1963 film, the 'Science of Zazen', Kasamatsu and Hirai concluded: 'But we believe that Zazen alone can not take the place of medical psychotherapy, though it certainly can be used as a useful adjunct or supplement.'[92]

West's 1979 review of research from the 1950s and 1960s acknowledged the importance of these early studies but drew attention to their variable quality. He also conceded limitations in some of the earlier work, commenting on its preliminary nature: 'As a result, the experiments lacked the control and sophistication of later work. Nevertheless, they do represent

[90] Kasamatsu and Hirai, 'An Electrocephenolographic Study on the Zen Meditation (Zazen)'. p. 331.
[91] Kasamatsu and Hirai, 'An Electrocephenolographic Study on the Zen Meditation (Zazen)'.
[92] Akira Kasamatsu and Tomio Hirai, 'Science of Zazen', *Psychologia*, 6.1–2 (1963), 86–91 <https://doi.org/10.2117/psysoc.1963.86>. p. 90.

an attempt to evaluate meditation in situ among the accomplished yogis of India and the Zen masters of Japan.'[93]

In contrast, West described Peter Fenwick's 1960 experiment as: 'The first well controlled EEG study of meditation' and Kasamatsu and Hirai's 1966 investigation as 'another careful study'.[94] We see, even at this early stage of the science of meditation, the gatekeeping function of strategic reviews, West describing which experiments were 'well controlled' or 'careful'. EEG was the most influential technology used to understand the effects of meditation during this period; it was frequently combined with batteries of physiological tests, from which a consensus grew that meditation led to more relaxed physical states. Sugi and Akutsu's findings from their 1968 Zen study reflect this pattern: 'E.C.G, heart rates, blood pressures and pulses are shown relatively calm, but no remarkable changes are observed.'[95] Although Kasamatsu and Hirai's 1966 study offered a valuable template for an EEG study of meditators, a new approach to meditation research was being developed in India. Peter Hazelhurst wrote in *The Times* in May 1969 that two Indian meditation scientists, Anand and Chhina, were in collaboration with the TM movement to investigate how meditation changed metabolic rates and thus mediated relaxation and arousal.[96] This partnership between science and a spiritual tradition would become a defining feature of meditation research for the rest of the twentieth century. However, despite the part played by Anand and Chhina in the investigation of TM, the view of scientists from Japan and India during this period was predominantly that psychology and religion were not in competition. Kasamatsu and Hirai contended in their 1963 film script that science could not understand what spiritual practice was but could investigate it objectively:

[93] West, 'Meditation.' p. 369.
[94] West, 'Meditation.' p. 369.
[95] Sugi and Akutsu. p. 205.
[96] Hazelhurst, 'Yogis' Claims Are Put to the Test'.

> Now we are going to deal with Zen meditation as an object of science, especially physiology and psychology. We must admit, however, that Zen is a spiritual exercise and can be grasped only by personal experience. Still it should be worthwhile to study Zen meditation scientifically.[97]

This was a view that differed dramatically from the approach adopted by scientists in the USA during the development of medicalised meditation.

8. Conclusions

There is evidence that the scientific study of meditation predates Walter's 1938 paper and that further research is likely to reveal earlier positivist investigations in digital or, more likely, paper archives. Meditation research before 1970 was an international affair with important contributions made by Indian and Japanese scientists. One of the characteristics of Japanese research was the acceptance of Zen descriptions of mental states without needing to translate the concepts into positivist terms. It appears that some Asian scientists could acknowledge the presence of non-scientific concepts while conducting experiments. This behaviour indicates freedom from the dualistic approach of creating one overarching discipline (scientific, religious or integrated) that characterised the medicalised meditation movement after 1970. It might also explain Thomas's findings that the scientific practice of Indian scientists was not affected by religious beliefs. If so, this raises the likelihood that scientific attitudes towards belief are culturally situated and not simply matters of rational thought or scientific understanding. It also sets out the possibility that the relocation of Eastern meditation techniques inevitably required a translation from a nondual to a dualistic understanding in order

[97] Kasamatsu and Hirai, 'Science of Zazen'. p. 88.

to convert the knowledge to the ontological frameworks employed in the psychological sciences.

The Counter-culture was a major factor in the growth of meditation research in the 1960s in at least two ways. There was a challenge to medical orthodoxy where more holistic health interventions such as meditation were welcomed. Secondly, at the same time, Counter-culture influencers such as Watts and Suzuki were promoting the idea of synergy between Eastern spiritual knowledge and psychology and psychotherapy. There is a good fit here that helps to explain the movement towards medicalised meditation. The creation of Zen Psychotherapy appears to have been an important first formal stage towards recruiting religious practices as health treatments. Fromm and Suzuki's influence extended beyond the centre of Counter-culture activity in the USA and UK, even observable in Kasamatsu and Hirai's 1966 paper 'An Electrocephenolographic Study on the Zen Meditation (Zazen)'.[98]

The presence of Buddhist concepts in the Counter-culture and new psychological therapies in the late 1950s and beyond are examples of the circulation of human technologies and practices in multiple directions over temporal and geographical boundaries. The growing presence of Eastern knowledge in the West reflected approaches to health in India at the start of the twentieth century. That, in some colonial contexts, an individual's health needs could not be totally surrendered to technocratic visions of treatment and cure. However, while many Indian and Japanese scientists accepted science alongside religious worldviews, Western philosophers, psychologists, and therapists started integrating belief-based practices into the rationales of medico-scientific domains.

Despite being widely considered as the first scientific study of meditation, Das and Gastaut's work did not generate immediate interest. However, it established precedents, particularly using EEG technologies to identify increased alpha wave activity and resistance to

[98] Kasamatsu and Hirai, 'An Electrocephenolographic Study on the Zen Meditation (Zazen)'. p. 316.

alpha blocking. The consistent demonstration of increased alpha wave activity and changes to normal patterns of alpha-blocking provided scientists with a degree of replication. At this stage, each new study presented further questions and new possibilities. For example, Das and Gaustaut's identification of beta wave activity and Kasamatsu and Hirai's observation of theta waves in Zen priests were novel findings not seen in many other studies. So, from the outset, experiments illustrated similarities and differences in the observed effects of meditation on brain waves. These contrasts are likely linked to the range of meditation methods investigated and the variable application of experimental techniques. Many studies from this period combined EEG data with measurements of physiological states such as changes in heart rates and skin conductivity. As research progressed, a consensus emerged that meditation led to more relaxed physiological conditions correlated with increased alpha brain wave activity and the occasional presence of theta waves.

Our understanding of early meditation research is based on a small number of studies and reviews, many preliminary in nature, using limiting methodologies such as low participant numbers and lack of controls. This view is supported by Michael West's critical review from 1979, which described variable scientific merits in experimental work.[99] So even before the advent of medicalised mindfulness, there was an evaluation system in place where reviewers described the quality of experiments, signposting 'good' and 'bad' science.

There is a lack of theoretical and operational discussion of meditation methods, individually or collectively, in the literature from this period, partly explaining the variations in findings between studies. For example, experiments conducted in Japan focussed on Zen meditation, whereas Indian scientists investigated yogic meditators. It seems possible that different forms of meditation, developed in diverse religious and cultural contexts, would influence brain function and structure in different ways. The relationships between the

[99] West, 'Meditation.'

scientists and the spiritual practices under investigation are also unlikely to have been uniform. For example, the extent to which scientists were engaged with the methods they investigated was unclear. However, because all forms of meditation shared some characteristics (increases in alpha frequency) but not others (theta wave activity), a detailed cognitive understanding of the different forms of meditation was problematic. These early scientific studies did not evaluate the explicit health potential of mediation technologies. Instead, scientists were primarily involved in investigating what mental states and traits meditation gave rise to. However, as the 1960s drew to a close, there was evidence that new closer relationships between the research processes and the TM organisations were being formed.

Chapter 3. Balancing Positivism with Pragmatism: 1970 to 1985

1. Introduction

After the relatively pedestrian progress of meditation research up to 1969, the following 15 years saw several radical shifts, which can be summarised as the medicalisation of meditation. Given the significance of this term going forward, my preliminary explanations in the Introduction require further clarification, provided in Section 1 below. This chapter describes how, in 1970, Robert Wallace made positive findings about the health benefits of TM.[1] Claims emerging from Wallace's experiments led to a dramatic increase in meditation research, supporting the development of the RR in 1974 and MBSR in 1979.[2] Eventually, a mindfulness meditation movement emerged from the first clinical uses of MBSR, becoming one of the most influential health and wellbeing techniques of the early 21st century.

Between 1970 and 1985, Wallace, Benson and Kabat-Zinn stood out as the major protagonists of medicalised meditation. Wallace and Kabat-Zinn were embedded in scientific and spiritual communities and sought to demonstrate that belief-based meditation could be the basis for modern health interventions.[3] Benson did not explicitly seek to integrate spiritual and scientific knowledge. Still, his claim of generic curative potential in religious meditation methods overlapped with the experimental rationales and methodologies of Wallace and Kabat-

[1] Wallace, 'Physiological Effects of Transcendental Meditation'.
[2] These are the papers first describing these interventions. For the RR, see, Herbert Benson, John F. Beary, and Mark P. Carol, 'The Relaxation Response', *Psychiatry*, 37.1 (1974), 37–46 <https://doi.org/10.1080/00332747.1974.11023785>. For MBSR, see, Kabat-Zinn, 'An Outpatient Program in Behavioral Medicine for Chronic Pain Patients Based on the Practice of Mindfulness Meditation: Theoretical Considerations and Preliminary Results'.
[3] For details of Wallace's involvement with TM at UCLA see Jean Murphy, 'Transcendental Idea to Meditate About', *Los Angeles Times (1923-1995)* (Tribune Publishing Company, LLC, 1968) <http://chain.kent.ac.uk/login?url=https://www.proquest.com/historical-newspapers/transcendental-idea-meditate-about/docview/155827967/se-2> [accessed 29 October 2021] (p. 4). Kabat-Zinn wrote about his early engagement with meditation in Kabat-Zinn, 'Some Reflections on the Origins of MBSR, Skillful Means, and the Trouble with Maps'.

Zinn.[4] The ability of scientists to redraw the boundaries between religion and science reflected the importance of their agency in science creation at this time. Medicalisation was also the product of social and institutional forces. As discussed in the last chapter, the Counter-culture movement has advocated the psychotherapeutic benefits of Buddhist and Hindu knowledge since the 1950s.[5] However, the greatest catalyst for the medicalisation of meditation was the interest of the TM movement in establishing scientific validation for the benefits of this technique. TM was a Hindu mantra meditation that developed a significant following in the West, partly because of its simplicity and claimed benefits. In their cultural history of mindfulness published in 2015, 'When Mindfulness Is Therapy', Anne Harrington, a historian of science and John Dunne, a religious studies scholar, describe the rising interest in meditation as therapy after 1970. Their peer-reviewed paper explains the attraction of practising TM: 'TM became taught by the Maharishi Mashesh Yogi from India, the claim of TM was that a mere 15-20 minutes of practice twice a day would help a person's mind to become more peaceful, more intelligent, and more creative.'[6] It is easy to see why such claims would interest clinicians and scientists.

According to Dunne and Harrington, TM's engagement with science was born out of problematic events involving famous, high-profile students of the Maharishi:

> The relationship with the Beatles soured in 1968 (on retreat in India with him, some became convinced that the Maharishi had made unwanted advances on a female member of their party). That is important, because it led to a shift in the cultural positioning of TM. The Maharishi and his staff decided to stop pursuing fickle celebrities and instead woo the scientific community.[7]

[4] Benson, Beary, and Carol, 'The Relaxation Response'.
[5] Erich Fromm, D. T. Suzuki, and Richard De Martino, *Zen Buddhism and Psychoanalysis* (Oxford, England: Harper, 1960), pp. viii, 180.
[6] Harrington and Dunne. p. 8.
[7] Harrington and Dunne. p. 8.

TM's scientific engagement was led in the early 1970s by the work of Wallace, a TM practitioner, who, in 1969, was completing his PhD at the University of California at Los Angeles (UCLA). Wallace published experimental evidence that TM practice positively influenced practitioners' physiological states.[8] The claims in Wallace's 1970 paper, 'Physiological Effects of Transcendental Meditation', published in the high-profile journal *Science,* had an immediate impact and led to increased scientific interest in meditation—a field led by TM research for the rest of the decade. (Figure 7).

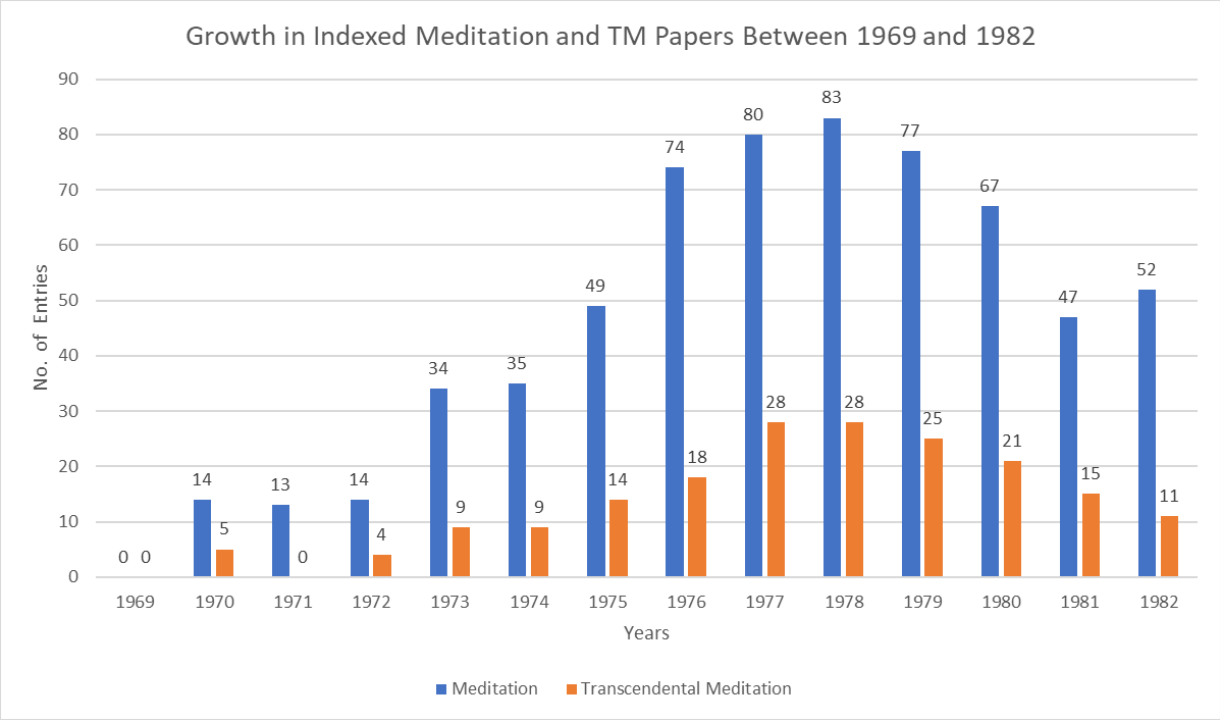

Fig. 7. Scopus entries indexed between 1969 and 1982 with the terms 'Meditation' and 'Transcendental Meditation' (TM) in the title, abstract or keywords. This data illustrates the proportion of meditation research linked to TM.[9]

Wallace's trajectory created a divergence from the traditional scientific study, the medicalised approach. Some scientists, such as West, challenged the scientific reliability of

[8] Wallace, 'Physiological Effects of Transcendental Meditation'.
[9] Elsevier, 'Document Search', 'meditation' and 'TM', *Scopus*, 2023 [accessed 29 September 2023]. https://www.scopus.com.

claims emerging from TM studies in a 1979 systematic review titled 'Meditation' published in *The British Journal of Psychiatry.*[10] The tension created by criticisms of early-stage medicalised experiments on methodological grounds developed into a pattern and ultimately led to the emergence of the mindfulness paradox discussed further in Chapter 6.

Establishing the science of meditation between 1938 and 1969 was a global project, but the medicalisation movement was initially confined to the USA. However, in this and the previous chapter, I have drawn attention to the research of Peter Fenwick, West and other influential European-based scientists who contributed to the scientific understanding and critical reviews of meditation research.[11] Following this Introduction, the first task in Section 2 is to refine the definition of medicalised meditation and its relationship to other scientific approaches and similar concepts. Wallace's early scientific work and his relationship with TM will be analysed in Section 3. The impact of medicalisation is discussed in Section 4. Further analysis will investigate the RR and its role as a bridge between TM and MBSR in Section 5. The early MBSR experiments will be reviewed in Section 6, and conclusions will be shared in Section 7.

2. Medicalisation: A Radical Shift in Meditation Research

The term medicalisation/medicalization is not new; the concept has been in the academic literature since at least the 1950s.[12] In 2017, British sociologist Joan Busfield explained its use in the 1960s as a term to describe social control through the regulation of medicine and health:

[10] For a summary see West, 'Meditation.' p. 459.
[11] For examples of their approach to TM see Peter Fenwick and others, 'Metabolic and EEG Changes during Transcendental Meditation: An Explanation', *Biological Psychology*, 5.2 (1977), 101–18 <https://doi.org/10.1016/0301-0511(77)90007-2>. And West, 'Meditation.'
[12] Joan Busfield, 'The Concept of Medicalisation Reassessed', *Sociology of Health & Illness*, 39.5 (2017), 759–74 <https://doi.org/10.1111/1467-9566.12538>. p. 759.

> The first use of the concept is usually identified as an encyclopaedia entry by the American sociologist, Jesse Pitts, on 'social control', a term then widely used by sociologists of deviance to refer to the social processes involved in regulating the behaviour of individuals and groups.[13]

Over the last decade, academics such as Kristin Barker have linked mindfulness to the encroachment of medicine into everyday life, extending what can be constituted as disease and treatment:

> In sum, the definition, cause, and treatment of disease as articulated by popular mindfulness resources expands the terrain of experiences and problems that are mediated by medical concepts. The case of mindfulness is a potent illustration of the changing character of medicalization itself.[14]

While it is possible to see medicalised meditation as another method of increasing medical concepts, the established definitions of medicalisation and medicalization do not encompass all the elements of the trajectory developed by Wallace and shared by Benson and Kabat-Zinn, such as an attempt to bring belief-based knowledge into medico-scientific domains. This unusual configuration sets medicalised meditation apart from other treatments that extend the medical franchise. The work of Wallace, Benson and Kabat-Zinn is not identical. Benson did not propose integrating traditional spiritual practices with science; he claimed that the curative potential in multiple spiritual practices can be synthesised into a secular intervention. Meditation experiments from the 1960s that used concepts from Zen Buddhism in their descriptions of mental states are qualitatively different from medicalised studies because they maintained the boundaries between belief-based knowledge and science. Medicalised

[13] Busfield. p. 759.
[14] Kristin K. Barker, 'Mindfulness Meditation: Do-It-Yourself Medicalization of Every Moment', *Social Science & Medicine*, 106 (2014), 168–76 <https://doi.org/10.1016/j.socscimed.2014.01.024>. p. 168.

meditation establishes a dualistic relationship between belief and science, where one understanding is dominant, religion, science, or a fusion of the two; to illustrate, Kasamatsu and Hirai's 1966 paper described Buddhist concepts objectively while producing a traditional scientific investigation, maintaining the independence of the two different world views.[15] Wallace argued that TM was consistent with science, Benson aggregated spiritual practices into a secular technique, and Kabat-Zinn used MBSR to bridge multiple spiritual methods and science into a singular concept. Scientists publishing medicalised studies often have close connections to the meditation methods they investigate; they use science primarily to demonstrate the curative potential of the meditation method, and their experiments tend to be pragmatic, leading to preliminary claims rather than robust replication.

3. Robert Wallace, TM and the Fourth State of Consciousness

Wallace's published work from 1970 contains two elements: his PhD dissertation and a journal article that marks a formal starting point of medicalised meditation.[16] In this section, his published work is described and analysed first, followed by an explanation of the context in which it appeared, its reception and its impact. Harrington and Dunne describe Wallace's work as a major shift:

> Then, in 1969, a graduate student at the University of California in Los Angeles, Robert Keith Wallace, decided to research the physiological effects of TM for his dissertation, and almost single-handedly largely changed the focus of that scientific conversation. Wallace recruited college students who had taken a course in TM, hooked them up to various measuring instruments, asked them to meditate, and found that on average they showed, significant changes in their physiological state:

[15] Kasamatsu and Hirai, 'An Electrocephenolographic Study on the Zen Meditation (Zazen)'.
[16] Robert Keith Wallace, 'The Physiological Effects of Transcendental Meditation: A Proposed Fourth Major State of Consciousness', 1970. The journal article is here, Wallace, 'Physiological Effects of Transcendental Meditation'.

> reductions in oxygen consumption; reductions in resting heart rate; and change in skin resistance. [17]

Wallace published his first paper, 'Physiological Effects of Transcendental Meditation', in the 27th March edition of the *Science* Journal.[18] This peer-reviewed study and his PhD thesis were published in the same year.[19] Before receiving his doctorate, Wallace was a physiology student at UCLA and an important member of the local TM chapter. While Wallace appears as a catalyst for a major shift in meditation research, his role in bringing belief-based meditation and science closer together is more obscure.

For clarity, I will describe and analyse Wallace's PhD project first as it provides essential detail about his motivation and the scientific trajectory of TM. The thesis, supported by a US Public Health Service Grant, was titled *The Physiological Effects of Transcendental Meditation: A Proposed Fourth Major State of Consciousness*. Wallace attempted to demonstrate the relationship between TM and a fourth 'transcendental' state of consciousness, described in Vedic texts but unknown to science.[20] This conscious state is foundational to elements of Hindu philosophy and contributes to the world view of TM: 'The fourth state of consciousness described by Maharishi has different identifiable physiological responses'.[21] However, Wallace could not have known he was creating a platform for other scientists to join his approach of using science to validate religious practices as health treatments.

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[17] Harrington and Dunne. p.8
[18] Wallace, 'Physiological Effects of Transcendental Meditation'.
[19] Wallace, 'The Physiological Effects of Transcendental Meditation: A Proposed Fourth Major State of Consciousness'.
[20] For an explanation of Hindu states of consciousness, see the definition for 'turiya' in Roshen Dalal, *Hinduism: An Alphabetical Guide* (Penguin Books India, 2010). p. 424.
[21] Thomas Arthur Egenes, 'The Place of the Veda in the Thought of Maharishi Mahesh Yogi: A Historical and Textual Analysis (Transcendental Meditation)' (unpublished Ph.D., University of Virginia) <https://www.proquest.com/docview/303401958/abstract/98E9778B54934478PQ/1> [accessed 10 August 2021]. p. 30.

The experimental methodology used by Wallace is comparable to other physiological studies of meditators from this period. His abstract sets a clear scientific programme for the dissertation:

> 'Oxygen consumption, CO_2 elimination, cardiac output, heart rate, respiration rate, arterial blood pressure, arterial blood gases, arterial lactate concentration, skin resistance and electroencephalograph measurements were recorded before, during, and after subjects practiced a technique called transcendental meditation.'[22]

A scientific strength of the paper is the breadth of objective measures used to describe the altered physiological states experienced by meditators.[23] Wallace observed a reduction in oxygen consumption of 20 per cent, a doubling in skin resistance, a mean decreased heart rate of five beats per minute and an increase in alpha wave amplitude, with no alpha blocking. [24] Also, low-voltage theta waves were recorded for short periods in four participants.[25] But Wallace also illustrated the physiological differences between other relaxed states (sleep and hypnosis) and TM, promoting the hypothesis that TM practice was linked to a novel and health-bearing conscious state: 'The EEG pattern during meditation clearly distinguishes this state from the sleeping state. There are no slow (delta) waves or Sleep spindles, but alpha-wave activity predominated.'[26]

Wallace aligned the project with both scientific literature and belief-based knowledge. For example, in his rationale, he maintained 'that a unique state of consciousness, the transcendental state, is physiologically definable and easily and immediately produced in all

[22] Wallace, 'The Physiological Effects of Transcendental Meditation: A Proposed Fourth Major State of Consciousness'. p. xiv.
[23] Wallace, 'Physiological Effects of Transcendental Meditation'. pp. 1751-1752.
[24] For a practical example of habituation and alpha blocking see, Elena Antonova, Paul Chadwick, and Veena Kumari, 'More Meditation, Less Habituation? The Effect of Mindfulness Practice on the Acoustic Startle Reflex', *PLOS ONE*, 10.5 (2015), e0123512 <https://doi.org/10.1371/journal.pone.0123512>.
[25] Wallace, 'Physiological Effects of Transcendental Meditation'. p. 1752.
[26] Wallace, 'The Physiological Effects of Transcendental Meditation: A Proposed Fourth Major State of Consciousness'. p. 91.

practitioners'.[27] He cites Maharishi's translation of an ancient Hindu text, the Bhagavad Gita, to establish his case.[28] In highlighting the benefits of TM, Wallace drifts away from empirical measurement and evidence-led claims. Discussing the difference between TM and other forms of meditation, he draws on subjective accounts of his participants:

> However, in the case of transcendental meditation, all subjects reported that the technique involves neither contemplation, concentration or any type of control or manipulation, but allows the mind to naturally experience "subtler" or more abstract levels of thinking.[29]

There is no scientific description of these phenomena or the mechanism by which 'all subjects reported' their meditative experience. The Maharishi is also cited to establish the rationale of TM as a health intervention: 'likewise the transcendental state is natural and necessary to relieve deep-rooted stresses'.[30] This mixture of the objective and subjective, the religious and the scientific, became a hallmark of medicalised meditation. Rather than using religion to extend the reach of treatment and cure in society, Wallace argues that TM offered a new way of understanding the human condition consistent with scientific knowledge and was positive about his results: 'In conclusion, the above findings and hypotheses suggest that transcendental meditation produces a fourth major state of consciousness which is physiologically and biochemically unique.'[31] Although Wallace suggests a convergence between science and belief in the main body, his Appendices further describe the benefits of traditional spiritual

[27] Wallace, 'The Physiological Effects of Transcendental Meditation: A Proposed Fourth Major State of Consciousness'. p. 11.
[28] Wallace, 'The Physiological Effects of Transcendental Meditation: A Proposed Fourth Major State of Consciousness'.
[29] Wallace, 'The Physiological Effects of Transcendental Meditation: A Proposed Fourth Major State of Consciousness'. p. 95.
[30] Wallace, 'The Physiological Effects of Transcendental Meditation: A Proposed Fourth Major State of Consciousness'. p. 96.
[31] Wallace, 'The Physiological Effects of Transcendental Meditation: A Proposed Fourth Major State of Consciousness'. p. 107.

knowledge. Appendix I makes his case for using TM as a health and wellbeing intervention: 'These physiological changes all suggest that the state produced by transcendental meditation may have practical applications to clinical medicine.'[32] In Appendix II of the document, detailed explanations of the ancient philosophical foundations of TM are described:

> Maharishi states that the technique involves no suggestion, belief, mental control or physical manipulation. He also explains that the technique comes from the ancient Vedic tradition and it must be taught by a teacher who has been qualified through necessary training.[33]

So, although TM is positioned as congruent with science, its full exposition and the training of practitioners were to remain in the spiritual domain, the religio-scientific duality was preserved. While completing his PhD at UCLA, Wallace also conducted experiments published in *Science.*[34] Wallace's experimental account is not a significant methodological departure from earlier meditation studies. Harrington and Dunne argue that in common with his dissertation, his journal article reflected a new approach to meditation research, one that combined the religious and scientific:

> The Maharishi and his followers had long claimed that TM practice produced a unique state of consciousness. Wallace, it seemed, had now proven them right. In 1970, Wallace announced his discovery of a "fourth major state of consciousness" in the flagship journal, Science.'[35]

The results from the experiments supported three overarching scientific findings. First, Wallace demonstrated meditation's effect on brain-body physiology; secondly, the practice of

[32] Wallace, 'The Physiological Effects of Transcendental Meditation: A Proposed Fourth Major State of Consciousness'. p. 109.
[33] Wallace, 'The Physiological Effects of Transcendental Meditation: A Proposed Fourth Major State of Consciousness'. p. 118.
[34] Wallace, 'Physiological Effects of Transcendental Meditation'.
[35] Harrington and Dunne, 'When Mindfulness Is Therapy'. p. 9.

TM could produce a relaxed state with a lowered metabolism; and finally, the meditative state was unlike sleep or hypnotic states: 'The EEG pattern during meditation clearly distinguishes this state from the sleeping state. But there are no slow (delta) waves or sleep spindles, but alpha-wave activity predominated.'[36] However, this was an account of experimental research at an early stage. There were several limitations in the methodological approach, such as the low number of participants. Only 15 meditators contributed to the project, of which five provided heart rate data. The experiment lacked blinding, randomisation and adequate control measures. For example, changes observed in participants were not measured against controls (people not meditating); meditators' resting values were used as the baseline measurement. Wallace repeated the anecdotal claims used in the PhD thesis of the benefits of practising TM: 'It is claimed by the proponent that all practitioners immediately experience beneficial physiological changes.'[37] In a scientific paper, 'all practitioners' is a problematic claim when not supported by empirical data.

In describing the merits of using TM in an experimental study, Wallace again uses subjective accounts of the participants: 'Subjects report that the technique is easy and enjoyable and does not involve concentration, contemplation, or any type of control and that they, therefore, find no difficulty in meditating during the experiment.'[38] Despite using just 15 participants in his study, Wallace claimed to have access to a large group of TM practitioners: 'a large number of subjects were readily available who had received consistent and uniform instruction through an organization that specializes in teaching this technique.'[39] No data was used in the paper to establish the meaning of a 'large number of subjects', although we know

[36] Wallace, 'Physiological Effects of Transcendental Meditation'. p. 1753.
[37] Wallace, 'Physiological Effects of Transcendental Meditation'. p. 1752.
[38] Wallace, 'Physiological Effects of Transcendental Meditation'. p. 1752.
[39] Wallace, 'Physiological Effects of Transcendental Meditation'. p. 1752.

the UCLA chapter of TM was thought to have over 1000 members around this time. No evidence was produced to support the claim of 'consistent and uniform training'.

Turning to his Conclusions, a departure from traditional meditation experiments is visible. Wallace offers a mixture of evidence and opinions in his paper, such as: 'The fact that transcendental meditation is easily learned and produces significant physiological changes in both beginners and advanced students give it certain advantages over other, more austere techniques.'[40] In addition to promoting TM as a more accessible technology than other forms of meditation, he also presents TM as a panacea, making claims extending far beyond his research:

> Transcendental meditation has been reported to have practical therapeutic value in relieving mental and physical tension. Its value in the alleviation of drug abuse has been suggested, and its value in controlling arterial blood pressure is being investigated. It could also have other applications-for instance, in space travel. [41]

Wallace's paper was not unscientific; it contains much relevant scientific theory and practice. However, compared to traditional scientific investigations, there is a much more flexible approach where anecdotes and religious knowledge play important roles. Wallace also placed health at the centre of his conclusions, where he privileged the potential of TM as a treatment above a detailed exposition of physiological processes. It is important to acknowledge that despite the impact of Wallace's article, he was at the beginning of his scientific career and relatively inexperienced. Both the tone of this paper and its wider reception shifted meditation research into a new direction, contributing to the discourses linking belief, science, and health.

[40] Wallace, 'Physiological Effects of Transcendental Meditation'. p. 1752.
[41] Wallace, 'Physiological Effects of Transcendental Meditation'. p. 1754.

For example, Daniel Goleman, a respected contributor in this field, cited Wallace's work in a journal article in 1971.[42]

4. Medicalisation and the Trajectory of Meditation Research After 1970

Wallace's scientific activity alone did not account for his 'breakthrough' paper nor its impact. Harrington and Dunne claim that TM's strategy is to increase engagement with scientists.[43] While Harrington and Dunne have provided some detailed insights into the shift to medicalised meditation, the connections between Wallace and TM are underrepresented in their account. Returning to Shapin's discussion of the Edinburgh phrenology debate, Wallace's commitment to spiritual values is worthy of more detailed consideration. Particularly as his paper promoted TM as the most useful form of meditation for scientific experiments without clear evidence; this point was emphasised by Julian Davidson in 1984:

> Perhaps because of Maharishi's scientific education and perhaps as a device to attract followers in Western technologically oriented countries, the TM movement has placed great stress on physiological responses in meditation and on scientific research on its psychological and medical effects. As a direct result of this, most of the relevant current research on meditation uses TM practitioners, and much of it enjoys the support if not the sponsorship of the movement.[44]

[42] Goleman took Wallace's work at face value and used it as a platform for his own ideas about consciousness, see Goleman.
[43] Harrington and Dunne, 'When Mindfulness Is Therapy'. p. 9.
[44] Julian M. Davidson, 'The Physiology of Meditation and Mystical States of Consciousness', in *Meditation: Classic and Contemporary Perspectives,* ed. by Dean Shaoiro Jr. and Roger Walsh (New York: Aldine Publishing Company, 1984), pp. 376–95. p. 377.

Wallace was an influential figure among many TM practitioners based at UCLA.[45] In an interview with Robert Wallace and his brother Peter in 1969, Jean Murphy, a journalist at the LA Times, wrote about students benefitting from practising TM: 'Two such students are Peter and Robert Keith Wallace, founder and president respectively of the 1,100-member Students, International Meditation Society at UCLA.'[46] Wallace drew his experimental participants from the meditation group where he was active.[47] These overlaps between spiritual and scientific practices raise concerns about the scientific nature of TM research and the methodology for selecting experimental participants.[48]

In his 1982 study of changes to religious organisations, Eric Woodrum claimed Wallace's scientific publications were promoted and distributed by the TM organisation, actions likely to increase the impact of Wallace's work and scientific interest in TM generally:

> In that year Robert Keith Wallace, who earlier organised a chapter of SIMS on the U.C.L.A. campus and helped formulate the original "Science of Creative Intelligence" academic course with Jerry Jarvis, completed a doctoral thesis entitled "The Physiological Effects of Transcendental Meditation: A Proposed Fourth Major State of Consciousness." Wallace performed tests for physiological correlates of TM on 27 meditators obtained through his local SIMS center with "each subject act[ing] as his own control". Following his findings' publication by the TM organisation there mushroomed a series of articles which, if positive, were also reproduced and distributed by the movement. [49]

The Student International Meditation Society (SIMS) is the branch of TM that promotes the TM method to students in further and higher education. SIMS UCLA is reported as having over

[45] A newspaper report describes Wallace's extensive involvement as a President of the TM meditation group at UCLA before the publication of his thesis. Murphy. (p. 4).
[46] Murphy. (p. 4).
[47] See footnote 7 in Wallace, 'The Physiological Effects of Transcendental Meditation: A Proposed Fourth Major State of Consciousness'. p. 1752.
[48] West, 'Meditation.' p. 458.
[49] Eric Woodrum, 'Religious Organizational Change: An Analysis Based on the TM Movement', *Review of Religious Research*, 24.2 (1982), 89 <https://doi.org/10.2307/3511099>. pp. 94-95.

1100 members around this time; 27 seems to be a low number of participants in the experiments, considering the number of available meditators.[50]

Within three years of completing his PhD thesis and following a collaboration with Benson, Wallace was appointed the first President of the Maharishi University.[51] This role change illustrated Wallace's close relationship with the TM organisation, limiting his contribution to further TM research. However, the reshaping of Wallace's career did not halt scientific interest in TM. The academic database Scopus recorded no published TM articles in 1969, but from 1970, the annual total grew to 28 by 1979 before declining (Figure 7). During the 1970s, there was an increase in the quality, quantity, and scope of published studies. However, like the later trajectory of MBSR, TM research was promising but lacked replication. For example, claims made in the Folsom Prison study illustrated the perceived potential of TM practices across society. These experiments conducted by Allan Abrams and Larry Siegel, claimed in 1978 that TM could reduce levels of violence in prison.[52] However, this paper was criticised for serious methodological flaws in correspondence published in the *Criminal Justice and Behavior* journal by Don Allen, a prison psychologist.[53] Allen pointed out that an effect in a control group was regarded as a result of the intervention in the Fulsom experiment, a controversial interpretation of the data.

Despite the widespread interest in TM, meditation researchers rarely considered the Vedic concepts underpinning the practice. In his 2011 discussion of the tension between Vedic knowledge and science, Scott Lowe contends that during the 1970s, the TM organisation

[50] Murphy.
[51] Maharishi International University, 'Robert Keith Wallace | Faculty of Physiology and Health' <https://www.miu.edu/academic-departments/physiology-and-health/introduction/faculty-staff/robert-keith-wallace>[accessed 26 August 2020].
[52] Allan I. Abrams and Larry M. Siegel, 'The Transcendental Meditation® Program and Rehabilitation At Folsom State Prison', *Correctional Psychologit*, 5.1 (1978), 3–20 <https://doi.org/10.1177/009385487800500101>[accessed 29 August 2020].
[53] Don Allen, 'Tm At Folsom Prison', *Criminal Justice and Behavior*, 6.1 (1979), 9–12 <https://doi.org/10.1177/009385487900600102>[accessed 25 October 2023].

promoted its ideas as 'scientific', but what this meant was uncertain.[54] According to Lowe, the founder of TM regarded science as a means to an end:

> In hindsight, it appears that Maharishi always used Western science as a tool to introduce the higher truth of Vedic science. Insofar as Western science appears or can be interpreted to support Vedic science, it is valued. Where it disagrees, it is dismissed as speculative and immature.[55]

Uncertainty in the boundaries between belief and science was not restricted to meditation research and can be seen in other TM projects. Lowe describes how, in 1979, a court case in New Jersey ruled that TM was a religious and not a scientific practice:

> In the first, a landmark court case in New Jersey (Malnak v. Yogi 1979) ruled that TM was a religious practice, and as such could not be taught in public schools. As part of the ruling, it was determined that the glossy textbook on the Science of Creative Intelligence developed for secondary school pupils was teaching a vague but recognizable variant of Advaita Vedanta.[56]

This finding suggests Wallace's experiments could be considered part of a wider project to introduce TM within society more generally. In 1971, Wallace joined forces with Benson, a Harvard-based cardiologist and health researcher and co-authored a TM research paper with Archie Wilson.[57] Benson's contribution to medicalised meditation will be analysed in the following section. A vital issue here is the ease with which knowledge originating in the Vedic tradition was imported into the scientific domain. Notwithstanding Wallace's dissertation, there is no clear explanation or evaluation of how, on a theoretical level, TM could be integrated with

[54] Lowe. pp. 54-55.
[55] Lowe. p. 70.
[56] Lowe. p. 62.
[57] Robert. K. Wallace, Herbert. Benson, and Archie. F. Wilson, 'A Wakeful Hypometabolic Physiologic State.', *The American Journal of Physiology*, 221.3 (1971), 795–99 <https://doi.org/10.1152/ajplegacy.1971.221.3.795>.

science. There was clear potential for incongruence in combining the philosophy of Advaita Vedanta in a scientific study of meditative states.[58]

Compared to the breakthroughs from the 1950s and 1960s that linked meditation to new ways of understanding alpha and theta wave activity, the scientific investigation progressed relatively slowly between 1970 and 1980.[59] To some extent, it was a period where consolidation and elaboration of earlier studies took place. The movement towards medicalisation focussed much research on the effect of meditation rather than robust scientific understanding or the development of testable hypotheses. This ten-year period saw a tension between medicalised and scientific approaches develop. Medicalised investigations, by their nature, applied belief-based techniques to health issues. At the same time, other sections of the scientific community sought to continue refining the psychophysiological correlates of meditation practices.[60] But these two strands were entangled, and Wallace's explicit use of religious knowledge was relatively rare. For example, David Orme-Johnson's study 'Autonomic Stability and Transcendental Meditation' explored reactions to stress between meditators and non-meditators and: 'Found that physiological indices of stress were lower in 13-40 yr olds who regularly practised Transcendental Meditation.'[61] This paper is an example of a scientific study that followed Wallace's trajectory but did not directly reference religious sources. Thus, the notion of a rigid divide between medicalised and non-medicalised meditation science is unreliable. However, a spectrum of approaches is visible in the scientific literature, with the traditional application of the scientific method at one pole and more flexible medicalised techniques

[58] Lowe. p. 62.
[59] For a review of meditation research in the 1970s see the 1979 review by West, 'Meditation.'
[60] Robert L. Woolfolk, 'Psychophysiological Correlates of Meditation', *Archives of General Psychiatry*, 32.10 (1975), 1326–33 <https://doi.org/10.1001/archpsyc.1975.01760280124011>.
[61] For example David W. Orme-Johnson, 'Autonomic Stability and Transcendental Meditation', *Psychosomatic Medicine*, 35.4 (1973), 341–49 <https://doi.org/10.1097/00006842-197307000-00008>. p. 341. Orme-Johnson would later work for the Maharishi University, see David W. Orme-Johnson, 'Preventing Crime Through the Maharishi Effect', *Journal of Offender Rehabilitation*, 36.1–4 (2003), 257–81 <https://doi.org/10.1300/J076v36n01_12>.

engaging with belief-based knowledge at the other. Although there were tensions between the medicalised and non-medicalised camps, both contributed to the scientific understanding of the effects of meditation. As seen in Chapter 6, the same pattern underpinned the development of mindfulness meditation after 2000.

In the second half of the 1970s, Robert Woolfolk was one of many scientists voicing concerns about growing theoretical and methodological uncertainty in meditation research in his 1975 paper 'Psychophysiological Correlates of Meditation', arguing for improved experimental approaches: 'Additional research into the mechanisms underlying the phenomena of meditation will require a shifting from old to new methodological perspectives that allow for adequate experimental control and the testing of theoretically relevant hypotheses.'[62] West highlighted failures to measure the physiological changes occurring in meditation against both control participants and other relaxation techniques.[63] In a comparative study in 1977, Fenwick cast doubt over the precise nature and cause of metabolic changes seen in TM research and even the presence of a fourth conscious state accessible through TM practice:

> No evidence could be found to suggest that meditation produced a hypometabolic state beyond that produced by muscle relaxation and there was no evidence that the EEG changes were different from those observed in stage 'onset' sleep. No support was found for the idea that transcendental meditation is a fourth stage of consciousness.'[64]

The same study demonstrated how using control groups could garner new insights from meditation experiments. By comparing the effects of meditation to alternative relaxation techniques, a clearer understanding of the benefits of meditation could be arrived at:

[62] Woolfolk. p. 1326
[63] West, 'Meditation.'. p. 459.
[64] Fenwick and others. p. 114.

> It was also found that non-specific techniques of relaxation such as listening to music were equally as effective as meditation. One significant point was that the changes which were produced by meditation and by listening to music were relatively trivial in physiological terms and were similar to the degree of change which occurs in a person sitting quietly, half raising and then relaxing his arm.[65]

These methodological criticisms of meditation research from 1977 predate the first MBSR experiments but remain a fixture of critical reviews of mindfulness studies to this day, illustrating a problematic continuity across different forms of medicalised meditation research.

After the initial enthusiasm for medicalised meditation in the early 1970s, meditation research entered a period of 'correction' where some scientific reviews and attempts at replication challenged less scientific approaches, including some medicalised experiments. Wallace's claim for the fourth state of consciousness was questioned in 1975 by Joel Younger, Wayne Adriance, and Ralph Berger, who found overlaps between sleep and meditation states in the EEG patterns of TM practitioners: 'The records, scored blind showed that all but 2 Ss spent considerable portions of their meditation periods in unambiguous physiological sleep.'[66] In 1980, an experiment conducted by Peter Seer and John Raeburn observed almost no difference between placebo and TM in lowering diastolic blood pressure.[67] In their 1987 study, Leonard Zaichkowsky and Randy Kamen looked back over previous research. They argued that despite many positive claims made for TM, the evidence was that it was no more effective than other interventions at lowering muscle tension and less able to manipulate related psychological constructs such as the locus of control.[68]

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[65] Fenwick and others. p. 114.

[66] Joel Younger, Wayne Adriance, and Ralph J. Berger, 'Sleep during Transcendental Meditation', *Perceptual and Motor Skills*, 40.3 (1975), 953–54 <https://doi.org/10.2466/pms.1975.40.3.953>.

[67] Peter Seer and John M. Raeburn, 'Meditation Training and Essential Hypertension: A Methodological Study', *Journal of Behavioral Medicine*, 3.1 (1980), 59–71 <https://doi.org/10.1007/BF00844914>.

[68] The locus of control is a technical term that describes the experience of a sense of agency, how much control one feels about life and dependent events. Leonard D Zaichkowsky and Randy Kamen, 'Biofeedback and Meditation: Effects on Muscle Tension and Locus of Control.', *Perceptual and Motor Skills*, 46.3 Pt 1 (1978), 955–58 <https://doi.org/10.2466/pms.1978.46.3.955>.

Despite the problems with medicalised meditation rsearch, there was a growing consensus about the role of meditation in mediating brain waves. An overview of EEG evidence from the 1970s confirmed four typical stages of meditation. (Table 2)

Stage	**Observed EEG data**
Initial	Alpha amplitude increase, possible frequency reduction.
Intermediate	Continued alpha waves with possible trains of theta waves in experienced meditators.
Deep	Bursts of high-frequency beta waves are possible.
Post	Alpha waves can persist after meditation, even with eyes open.

Table 2. Summary of EEG findings from meditation experiments during the 1960s and 1970s.[69]

During this period, scientists also confirmed the potential of meditation to reduce heart rate, respiration rate, oxygen consumption and skin conductance.[70] However, the size and significance of these effects varied between studies. West argued that the rate of non-EEG physiological changes observed in meditation research in the 1960s and early 1970s was generally found to be less pronounced in replicated studies: 'With the passing of time and the advent of more careful evaluations of meditation, the general trend of decreases on these parameters has been confirmed'[71] From 1970 to the early 1980s, the scientific study of meditation illustrates a rise and fall in scientific acceptance. After positive, sometimes sensational initial claims, more detailed studies and a more robust application of the scientific method begin to challenge some of the evidence underpinning preliminary enthusiasm.

[69] Table based on a summary from West, 'Meditation.' p. 459. See also Cahn and Polich and Shapiro and Walsh.
[70] Further details from these three reviews: West, 'Meditation.'; Shapiro and Walsh; Woolfolk.
[71] West, 'Meditation.' p 459.

5. Herbert Benson, TM and the Relaxation Response

In this chapter, I argue that Benson's work sits within the medicalised meditation movement; he also acts as a link between Wallace's and Kabat-Zinn's approaches.[72] Benson takes the process of medicalisation forward in two stages, initially by adding his scientific gravitas to the study of TM through collaborations with Wallace and others and then by developing the RR, which became a very successful theory of universal relaxation.[73]

I describe Wallace and Kabat-Zinn as scientist-practitioners, actors who integrated belief-based practice with their scientific approach. However, no evidence exists that Benson's convictions bled into his research. But this does not mean he did not get swept up by the new approaches of medicalisation. Benson, Wallace and Wilson published '*A wakeful hypometabolic physiologic state*' in September 1971.[74] This paper was much more scientific in content and form than Wallace's 1970 study, although it replicated many of Wallace's original findings. The study reveals much more about Benson's scientific ambitions than Wallace's. The final sentence from the study's conclusions was likely a signpost to the RR: 'However, the possibility exists that these changes represent an integrated response that may well be induced by other means.'[75] Any assertion that TM was not a unique method to bring about these observed physiological changes, let alone the fourth state of consciousness, would have been challenging for Wallace.[76] Wallace and Benson also published these findings in *Scientific American* in February 1972. This narrative, written for a more general audience, continued to put TM research onto a more 'scientific' footing. However, two other factors

[72] Kabat-Zinn, 'An Outpatient Program in Behavioral Medicine for Chronic Pain Patients Based on the Practice of Mindfulness Meditation: Theoretical Considerations and Preliminary Results'.
[73] Benson, Beary, and Carol, 'The Relaxation Response'. p. 37.
[74] Wallace, Benson, and Wilson.
[75] Wallace, Benson, and Wilson. p. 797.
[76] Wallace had claimed that TM was uniquely positioned to deliver proof of altered physical and mental states in Wallace, 'Physiological Effects of Transcendental Meditation'.

critical to the continued process of medicalisation are also visible in this work. First, the paper embeds the observed 'hypometabolic state' within the relevant literature; it draws on earlier findings and concepts in a time-honoured scientific fashion.[77] Secondly, the curative potential of meditation (through the 'hypometabolic state') is stressed but described in exclusively medico-scientific terms. Medicalised meditation requires a partnership between science, belief-based knowledge and clinical potential. Benson expressed Wallace's research in a more mainstream manner, but not without some compromises to traditional TM knowledge. This paper marked the end of Wallace and Benson's collaboration.

Benson was already an established health researcher in 1970. Harrington and Dunne describe his initial engagement with TM and early collaboration with Wallace and Archie Wilson in 1971 as something of a revelation:

> When Benson first began studying TM practitioners, he had not known of Wallace's work; but upon discovering it, he proposed a collaboration. Wallace moved to Harvard, and he, Benson and a third colleague, Archie F. Wilson, developed a new protocol to study their subjects. Blood pressure, heart rate, brain waves, rates of metabolism, and rates of breathing were all to be measured under two conditions: first, the subjects would be asked to sit quietly for 20 minutes; and second, they would be asked to sit quietly and meditate–repeat their mantra, etc. ------ for 20 minutes. The aim was to assess the distinctive contribution – if any – of meditation. "What we found," Benson later recalled, "was astounding. Through the simple act of changing their thought patterns, the subjects experienced decreases in their metabolism, breathing rate and brain wave frequency".[78]

However, this view of TM research's 'great leap forward' based on the 1971 paper is somewhat overstated. For example, the 1966 study of Zen practitioners by Akira Kasamatsu and Tomio Hirai had already combined data from EEG, pulse rate, respiration and Galvanic Skin Response (GSR).[79] In addition, having made the point that TM made a systematic attempt to engage with

[77] Wallace and Benson. p. 90.
[78] Harrington and Dunne, 'When Mindfulness Is Therapy'. p. 9.
[79] Kasamatsu and Hirai, 'An Electroencephalographic Study on the Zen Meditation (Zazen)'.

scientists after the late 1960s, Harrington and Dunne lack a critical perspective on the relationship between Wallace, Benson and the TM students who participated in the 1971 study. The small group of TM students were self-selected from a much larger pool of meditators; they pressed Benson to use them in an experiment. He described these unusual conditions in an interview published in Psychology Today in 2001:

> I was approached by young practitioners of transcendental meditation who asked me to monitor their blood pressure. They believed they had lower blood pressures as a result of their meditation practice. This type of study was unheard of, but I did consent, after much deliberation. Robert Keiter Wallace and I measured blood pressure, heart rate, brain waves, metabolism and rate of breathing.[80]

There are myriad potential methodological problems with experimental participants directing the research goals of scientists, particularly when one of the co-authors was also a committed TM practitioner.[81]

The Wallace-Benson partnership ended when Wallace joined the TM organisation in 1973. Through the collaboration, Benson had uncovered a rich vein of knowledge to explore. In 1974, Benson, John Beary and Mark Carol described the RR, a state produced by several different spiritual practices: 'The relaxation response appears to be an integrated hypothalamic response which results in generalised decreased sympathetic nervous system activity, and perhaps also increased parasympathetic activity.'[82] Building on this hypothesis, Benson and others argued that humans' innate fight or flight (ergotropic) response was mirrored by a relaxation (trophotropic) response: 'The relaxation response in man consists of changes

[80] Herbert Benson, 'Mind-Body Pioneer', *Psychology Today*, 2001 <https://www.psychologytoday.com/gb/articles/200105/mind-body-pioneer>[accessed 26 October 2023].
[81] The potential for 'Experimenter Effect' factors to influence behavioural studies was clearly understood and documented in the 1970s, see Robert Rosenthal, *Experimenter Effects in Behavioral Research, Enlarged Ed*, Experimenter Effects in Behavioral Research, Enlarged Ed (Oxford, England: Irvington, 1976), pp. xiii, 500.
[82] Benson, Beary, and Carol, 'The Relaxation Response'. p. 37.

opposite to those of the fight or flight response.'[83] Experimental support for this claim rested on the physiological changes already observed in TM research (reduced heart rate, oxygen consumption, skin conductivity, etc.). In addition to this, anecdotal evidence about the operational nature of other religious practices was added. Thus, Benson and colleagues concluded that relaxation induced by a combination of four functional components could bring about beneficial relaxed states. The four components are i) a mental device, ii) a passive attitude, iii) decreased muscle tonus and iv) a quiet environment. Benson and others speculated that these four elements could be found in several spiritual practices, thus offering a scientific hypothesis for the evidence of health benefits frequently claimed in meditation research.

One of the striking features of the 1974 paper is the departure from the previous evidence-led approaches in Benson's work. Here, we see subjective accounts from religious texts used to infer a relationship between the RR and belief-based practices:

> Techniques have existed for centuries, usually within a religious context, which allow an individual to experience the relaxation response. For example, in the West a fourteenth century Christian treatise entitled The Cloud of Unknowing discusses how to attain an altered state of consciousness which is required to attain alleged union with God. [84]

Rather like Wallace's rationale for the health benefits of TM in his 1970 journal article, the theoretical foundations of the RR were rooted in ancient spiritual practices. Science was employed retrospectively to explain their effects in the form of reverse engineering. The RR was described as a universal state that, if cultivated, could offer beneficial mental and physical conditions such as those seen in the practice of TM.[85] The relaxation response hypothesis was founded on generalisations about the health potential of techniques used in Christianity,

[83] Benson, Beary, and Carol, 'The Relaxation Response'. pp. 37-38.
[84] Benson, Beary, and Carol, 'The Relaxation Response'. p. 38.
[85] Wallace, 'Physiological Effects of Transcendental Meditation'.

Judaism, Sufism, Shintoism, Taoism, Yoga and Zen.[86] The lack of scientific evidence linking the different spiritual practices to the RR is problematic. There was no attempt to scientifically establish or catalogue the cognitive operational components of these spiritual methods. It appears that while meditation scientists were keen to use science to validate the benefits of medicalised meditation methods, they were unwilling or unable to apply systematic processes to support their claims about belief-based practices.

Benson was prolific in evidencing the health benefits of the RR; a detailed scientific study in *The Lancet* was typical of his attempts to document physiological changes caused by trophotropic reactions: 'The results show that the regular practice of a technique which elicits the relaxation response is associated with decreased blood-pressures in pharmacologically treated hypertensive patients.'[87] However, a review of meditation research from the 1970s by the psychologist David Holmes in 1984 failed to find any evidence for the potential of meditation to reduce somatic arousal: 'In view of those factors, it is important that we recognise that within the existing research there is no evidence that meditation is more effective for reducing somatic arousal than is simple resting.'[88] Benson and Friedman produced a rebuttal to Holmes's conclusions, claiming they were flawed, and both TM and the RR continued to attract scientific attention. Benson's research brought a much stronger evidential base to the claims that belief-based meditation held curative potential. However, the failure of Benson and his co-authors to compare meditation against the effects of other relaxation methods had placed the technique in an uncertain position. Meditation did appear to lower the metabolism through relaxation, but little was known about its effectiveness compared to other treatments or even just sitting calmly.

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[86] Benson, Beary, and Carol, 'The Relaxation Response'. p. 38.
[87] Herbert Benson and others, 'Decreased Blood-Pressure in Pharmacologically Treated Hypertensive Patients Who Regularly Elicited the Relaxation Response.', *The Lancet*, Originally published as Volume 1, Issue 7852, 303.7852 (1974), 289–91 <https://doi.org/10.1016/S0140-6736(74)92596-3>. p. 289.
[88] David S. Holmes, 'Meditation and Somatic Arousal Reduction: A Review of the Experimental Evidence', *American Psychologist*, 39.1 (1984), 1–10 <https://doi.org/10.1037/0003-066X.39.1.1>. p. 9.

In 1976, Benson and Miriam Klipper wrote a best-selling book based on the earlier scientific paper.[89] *The Relaxation Response* was a great success and went on to sell over six million copies, ensuring a broad audience for Benson's relaxation methods as a tool to improve wellbeing. Kabat-Zinn cited Benson's work, which was likely influential in the development of MBSR. Unlike Wallace, who only promoted TM, Benson and Kabat-Zinn developed health interventions aggregating multiple spiritual practices.[90]

6. MBSR: Mindfulness as a Treatment for Chronic Pain

Alongside TM and the RR, other meditation forms attracted scientific and clinical interest during the 1970s. While working in the Department of Psychiatry of the University of California, Roger Walsh documented the proliferation of meditation methods and experiments. Meditation was being trialled as a treatment for high blood pressure, anxiety, phobia, addiction, asthma, insomnia and other conditions able to benefit from a more relaxed state.[91] As previously discussed, the psychologist Deatherage also described the use of mindfulness in a psychotherapeutic setting in 1975.[92] However, while many of these proposed meditation-based therapies are virtually unknown today, Kabat-Zinn's MBSR technique has become a global health and wellbeing intervention.[93] Kabat-Zinn was awarded a PhD in molecular biology in 1971. Still, following exposure to spiritual teachings from different religious traditions, he changed his career trajectory and founded the Stress Reduction Clinic (SRC) at the University

[89] Herbert. Benson and Miriam Z. Klipper, *The Relaxation Response* (New York: Collins, 1976).
[90] Kabat-Zinn, 'An Outpatient Program in Behavioral Medicine for Chronic Pain Patients Based on the Practice of Mindfulness Meditation: Theoretical Considerations and Preliminary Results'. p. 34.
[91] Roger N Walsh, 'Meditation Research: An Introduction and Review', *Journal of Transpersonal Psychology*, 11.2 (1979), 161–74. p. 163 - 163
[92] Deatherage.
[93] For an estimate of scientific and media interest in mindfulness, see Van Dam and others. p. 37.

of Massachusetts Medical School (UMMS) in 1979.[94] At UMMS, he used meditation as a treatment for chronic pain. Kabat-Zinn launched a pilot study of an awareness meditation technique (which eventually became MBSR), treating outpatients who were referred to the Stress Reduction and Relaxation Program (SR&RP) at the SRC. The trial began in 1979, and the first results were written up in papers in 1981 and 1982. The 1981 study was an abstract published by Kabat-Zinn and Robert Burney in the *Pain* journal; this was the first published report on the clinical use of Kbat-Zinn's work.[95] Because of the full description of the clinical use of MBSR in the 1982 study titled 'An Outpatient Program in Behavioral Medicine for Chronic Pain Patients Based on the Practice of Mindfulness Meditation: Theoretical Considerations and Preliminary Results' and authored by Kabat-Zinn, I have used this as the starting point in discussions of the MBSR concept throughout this thesis.[96]

By breaking down the 1982 paper into three parts: its rationale, experiment, and conclusions, the similarities and differences between Wallace's and Benson's medicalised approaches come into a sharper focus. In explaining his rationale for developing MBSR, Kabat-Zinn includes anecdotal examples of pain management taken from Buddhist texts in positioning mindfulness as therapy: 'It, therefore, seemed reasonable to hypothesize that insights stemming from the observation of pain arising during meditation might serve as a model for developing a 'testable' intrapsychic strategy that patients may use for coping with chronic pain.'[97] The term testable is interesting here because Kabat-Zinn generally shunned testable hypotheses in favour of demonstrating correlations between mindfulness practice and improved health outcomes. Kabat-Zinn never made a convincing scientific connection between

[94] There is a great deal of useful background information in this autobiographical account of the origins of MBSR: Kabat-Zinn, 'Some Reflections on the Origins of MBSR, Skillful Means, and the Trouble with Maps'.
[95] Jon. Kabat-Zinn and Robert. Burney, 'The Clinical Use of Awareness Meditation in the Self-Regulation of Chronic Pain', *Pain*, 11 (1981), S273–S273 <https://doi.org/10.1016/0304-3959(81)90541-8>.
[96] Kabat-Zinn, 'An Outpatient Program in Behavioral Medicine for Chronic Pain Patients Based on the Practice of Mindfulness Meditation: Theoretical Considerations and Preliminary Results'.
[97] Kabat-Zinn, 'An Outpatient Program in Behavioural Medicine for Chronic Pain Patients Based on the Practice of Mindfulness Meditation: Theoretical Considerations and Preliminary Results'. p. 35.

belief-based meditation and pain treatment in this early work. For example, there were no descriptions of the operational elements of the practices that provided relief from pain and how they were carried over into MBSR.

Just as problematic is that MBSR was based on knowledge from multiple religious traditions without explaining how this aggregation occurred. Harrington and Dunne described the different spiritual traditions and practices combined in MBSR:

> It turns out that MBSR came from a melding of different traditions: Zen (the Korean Zen Master Seung Sahn first trained Kabat-Zinn as a Dharma teacher); the "nondual" Mahāmudrā tradition of meditative practice (as taught by Chögyam Trungpa Rinpoche); various yogic traditions; and a modernist version of insight meditation (associated with the Burmese teacher Mahasi Sayadaw) that – in contrast to older, more classical forms of the Theravada tradition - focused on the importance of simple forms of "mindfulness" practice, as distinct from approaches that embedded such practice in a complex lattice of textual study, asceticism and monasticism.[98]

As described in Chapter 1, establishing congruence between these approaches is improbable and most likely impossible. Perhaps Kabat-Zinn was presenting his interpretation of these practices, but the extent to which he had mastered them all is unclear. By using religious (non-scientific) accounts to establish a clinical role for mindfulness, MBSR followed the medicalised meditation trajectory. Scientific literature and concepts are also discussed throughout the 1982 paper, but they tend to support the use of mindfulness, often in abstract ways, rather than explain it. Kabat-Zinn writes: 'There exist dramatic accounts in the literature of the complete uncoupling of the sensory from the affective and interpretive components of pain, with resulting loss of alarm reactivity and pain behaviour.'[99] Support for this claim of 'uncoupling'

[98] Harrington and Dunne, 'When Mindfulness Is Therapy'. p. 11.
[99] Kabat-Zinn, 'An Outpatient Program in Behavioural Medicine for Chronic Pain Patients Based on the Practice of Mindfulness Meditation: Theoretical Considerations and Preliminary Results'. p. 36.

included controversial brain surgery techniques that lack any obvious conceptual relationship with the therapeutic use of mindfulness.

While Benson and Wallace attempted to establish scientific explanations demonstrating that TM and the RR could improve health and wellbeing, Kabat-Zinn took a different route, publishing his case for using MBSR retrospectively when it was already a treatment in an outpatient clinic. Wallace‘s work advocated engagement with TM as it was being taught in the TM movement; Benson, on the other hand, developed a secular synthesis of four major components he identified in multiple religious practices. Kabat-Zinn’s concept sits somewhere between these two approaches. Like Benson, he attempted to integrate methods from numerous spiritual traditions into one intervention, but he also combined religious knowledge and personal experience with scientific principles, not unlike Wallace:

> The choice of mindfulness meditation was based on the author’s experience of meditation, on reports in the traditional meditation literature concerning how to handle pain during intense meditation practice, and on theoretical considerations of pain perception, attention and their interaction.[100]

MBSR appears in the 1982 paper to have been built on an individualised understanding of traditional and scientific knowledge. As illustrated in Chapter 1, he described MBSR as a combination of breathing and 'sweeping' meditations combined with posture yoga exercises.[101] This combination of operational components is confusing because Kabat-Zinn did not consider yoga a form of mindfulness: 'Although hatha yoga per se is not a traditional mindfulness technique, it was taught emphasizing mindfulness.'[102] This claim demonstrated one of the

[100] Kabat-Zinn, ‘An Outpatient Program in Behavioural Medicine for Chronic Pain Patients Based on the Practice of Mindfulness Meditation: Theoretical Considerations and Preliminary Results’. p. 34.
[101] Kabat-Zinn, ‘An Outpatient Program in Behavioural Medicine for Chronic Pain Patients Based on the Practice of Mindfulness Meditation: Theoretical Considerations and Preliminary Results’. p. 36.
[102] Kabat-Zinn, ‘An Outpatient Program in Behavioural Medicine for Chronic Pain Patients Based on the Practice of Mindfulness Meditation: Theoretical Considerations and Preliminary Results’. p. 35.

problems in establishing definitions of mindfulness. If non-mindfulness techniques could benefit participants if they were taught mindfully, the boundaries between mindfulness training and naturally occurring mindfulness would be very hard to define.

Kabat-Zinn begins his scientific discussion through a literature review arguing the importance of motivational and cognitive factors in pain management.[103] However, of particular scientific interest was the reference to Ronald Melzack and Campbell Perry's experiments that found: 'that chronic, pathological pain can be reduced in a significant number of patients by means of a combination of alpha-feedback training, hypnotic training, and placebo effects.'[104] The link between the generation of alpha waves and reduced pain maintained the conceptual relationship between this pilot study and the scientific understanding of alpha wave augmentation in meditation. Patients attended the clinic for a two-hour weekly session for ten weeks, where they were taught the three mindfulness practices.[105] The patients were given homework tasks totalling about six hours of training each week in addition to the time spent in the clinic. Kabat-Zinn's account reveals an attempt to capture the meditation method without reference to its original theoretical framework(s), indicating that he considered the curative potential to be present in the process and not in the mental states of the original Buddhist practitioners. That the soteriological and ethical goals of Buddhist meditation were somehow irrelevant to the psychological and physiological effects of the practice.

The before and after experiences of pain from 51 patients from three treatment cycles were recorded using five different pain indices. Non-pain data across six fields was also

[103] Ronald Melzack and Patrick D. Wall, 'Psychophysiology of Pain', *International Anesthesiology Clinics*, 8.1 (1970), 3–34.
[104] Ronald Melzack and Campbell Perry, 'Self-Regulation of Pain: The Use of Alpha-Feedback and Hypnotic Training for the Control of Chronic Pain', *Experimental Neurology*, 46.3 (1975), 452–69 <https://doi.org/10.1016/0014-4886(75)90119-3>.
[105] Kabat-Zinn, 'An Outpatient Program in Behavioral Medicine for Chronic Pain Patients Based on the Practice of Mindfulness Meditation: Theoretical Considerations and Preliminary Results'. p. 37.

captured. Using standard statistical tools, the effect sizes were established, and the reduction in self-reported pain was found to be significant:

> At 10 weeks, 65% of the patients showed a reduction of greater than or equal to 33% in the mean total Pain Rating Index (Melzack) and 50% showed a reduction of greater than or equal to 50%. Similar decreases were recorded on other pain indices and in the number of medical symptoms reported.[106]

Kabat-Zinn noted that the pain reduction reported by patients was comparable to the results observed by Melzack and Perry in their alpha-feedback study. In its conclusions, the paper offers relatively little scientific insight into the relationship between the treatment and reduction in the experience of pain. Two obvious methodological issues impacting the reliability of these findings are the use of subjective measures of pain and unobserved 'homework' therapy, two elements that added unknown variables to the treatment process. However, the impressive results offered their own compelling reasons to continue with the programme.

Kabat-Zinn's experimental focus was to demonstrate clinical effectiveness, not advance a scientific explanation leading to a testable hypothesis. This approach was a rebalancing of the medicalised meditation paradigm and the increased dependence on scientific pragmatism.[107] However, little was learned from this paper about the causal relationships between MBSR and the reported participant outcomes. Kabat-Zinn contended: 'While this work does not prove that the meditation practice is directly responsible for these changes, it does suggest it.'[108] Given that Kabat-Zinn was working with patients experiencing intractable

[106] Kabat-Zinn, 'An Outpatient Program in Behavioral Medicine for Chronic Pain Patients Based on the Practice of Mindfulness Meditation: Theoretical Considerations and Preliminary Results'. p. 33.
[107] For a discussion of pragmatism in medicine, see Russell E. Glasgow and William T. Riley, 'Pragmatic Measures: What They Are and Why We Need Them', *American Journal of Preventive Medicine*, 45.2 (2013), 237–43 <https://doi.org/10.1016/j.amepre.2013.03.010>.
[108] Kabat-Zinn, 'An Outpatient Program in Behavioural Medicine for Chronic Pain Patients Based on the Practice of Mindfulness Meditation: Theoretical Considerations and Preliminary Results'. p. 46.

chronic pain, it could be argued that a medicalised approach was a better use of resources than the lengthy scientific investigations needed to establish a causal link between mindfulness and pain management. These contrasting positions are central to the tension between traditional and medicalised scientific approaches, ultimately leading to the mindfulness paradox.

7. Conclusions

There was a radical shift in meditation research in 1970; before that date, although studies were often preliminary, they were generally positivist. Wallace's experiments published in *Science* and his PhD thesis explicitly attempted to scientifically demonstrate the health benefits of practising TM. However, Wallace's claims mark the divergence of experimental meditation research into two approaches, traditional and medicalised. Harrington and Dunne's suggestion that Wallace was 'singlehandedly' responsible for establishing the new direction is an oversimplification. The conditions leading to the medicalisation of meditation originated from interdependent social, cultural, medical, scientific, religious and institutional forces exerted on many areas of society. Wallace's relationship with the TM organisation, in particular, was a major factor in the paradigm shift. Despite its unusual claims and methodological limitations, the positive reception of Wallace's papers demonstrates that sociocultural changes and the agency of scientists influenced the trajectory of meditation research.

Wallace joined forces with Benson and Wilson to continue investigating the health potential of TM in 1971; the exact nature of this relationship is unclear. Benson later revealed that in a departure from the normal conduct of scientific norms, his research was encouraged by members of the TM community who became participants in his experiments. The role of Wallace, a co-author of the research paper and a scientist-practitioner in the same religious traditions as the self-selecting participants, is also problematic from a methodological point of

view. The collaboration with Benson, an established health researcher at an elite academic institution, likely lent greater credibility to Wallace's work. The scientific and popular science papers they published together became more systematic in approach than Wallace's first published work from 1970.

Benson went on to develop the RR with colleagues, claiming to have identified the four elements from multiple spiritual practices that could bring universal health benefits. This work may have offered a template for Kabat-Zinn's MBSR rationale, which also claimed to have aggregated multiple spiritual practices and extracted their essence. Benson's scientific claims for the RR were contested, but his self-help books were very successful despite this uncertainty. Although medicalised meditation was supported by a growing acceptance of Eastern religious practices, there was a strong public appetite for the Westernised or presumed scientific validation of those approaches.

The divergence among meditation scientists became much clearer by the mid-1970s; many peer-reviewed papers followed the medicalised paradigm, but there were frequent criticisms from scientists who maintained a more traditional approach to experimental work. Although there were clear differences between medicalised and traditional research, there was no overarching dichotomy; scientific experiments sat on a spectrum with Wallace's medicalised approach at one end and more scientifically rigorous insight such as West's at the other. As the decade progressed, direct references to the religious foundations of medicalised meditation declined but were not withdrawn or modified; they were also rarely commented on by traditional meditation scientists. A lack of scholarly understanding of the complex ontological frameworks of Eastern spiritual traditions may explain why Benson's and Kabat-Zinn's sweeping generalisations about the nature and function of religious practices received little critical attention during the 1970s and 1980s. Western scientists appear to have focussed on the meditation method rather than the broader context in which religious meditation took place. In

particular, Kabat-Zinn stripped MBSR of its Buddhist theoretical framework, presenting a modernised method devoid of many of the intrinsic spiritual values underpinning traditional forms of meditation and the relevant cognitive effects they generated.

The initial growth in scientific interest in TM began to wane in the late 1970s for reasons that are not entirely clear. The commercial success of Benson and Klipper's RR book and the corrosive criticisms of the quality of medicalised meditation research were possible factors. It was at this time, in 1979, that Kabat-Zinn launched MBSR. With no apparent background training in medicine or psychology, Kabat-Zinn began to treat outpatients with intractable chronic pain at the SRC within the prestigious UMMS. Kabat-Zinn's approach had similarities and differences with the medicalised meditation model. Despite frequent methodological criticism of their work, Wallace and Benson conducted experiments to establish that TM or RR could provide therapeutic benefits. Conversely, Kabat-Zinn began his demonstration of the effects of MBSR in an outpatient clinic. His early work provides no testable hypothesis as to why mindfulness might reduce the experience of pain; rather, he gathered data that showed a correlation between mindfulness practice and improved self-reported patient outcomes. Despite overlaps between the work of Wallace, Benson and Kabat-Zinn, there is no evidence that medicalised meditation resulted from the coordinated activity between the three main protagonists; each appears to have worked towards their own goals. But we know that Wallace influenced Benson, who in turn influenced Kabat-Zinn.

In the 1970s, medicalised meditation was linked to many different health conditions; the notion that meditation might be a panacea was present in Wallace's first work and has been coupled with medicalised meditation ever since. There is evidence from this decade that meditation could be utilised as a generic relaxation technique by reducing heart rate, blood pressure and oxygen consumption. Still, major limitations in research, such as a lack of controls and comparisons, continued to undermine the reliability of experimental claims. A secondary

characteristic of medicalised meditation was the lack of testable hypotheses which would have grounded the practices in scientific theory. However, while this contributed to theoretical and methodological uncertainty, it lent MBSR fluidity; it was not shackled to Buddhist or scientific theoretical frameworks. A technique unsupported by a clear rationale could be deployed pragmatically in different medico-scientific settings. This idea was the first stage of medicalised meditation, and there was a rapid growth in the potential health applications of meditation, few supported by compelling scientific evidence.

Wallace demonstrated a fairly detailed understanding of Hindu concepts in his dissertation; the level of insider knowledge of multiple belief-based knowledge systems shown by Benson and Kabat-Zinn is much less certain. Kabat-Zinn's assertions about pan-spiritual mindfulness practices lacked scientific support or even an explanation of how multiple forms were integrated into MBSR. However, medicalised meditation scientists and their critics generally ignored the potential ontological conflict of introducing non-positivist concepts into experimental science. There is little evidence that Western scientists had any sense that religious traditions engaged with understandings of mind and matter that might be unknown or abstract to them. It appears that in that time and place, Western scientists working at elite institutions felt confident in making sweeping claims about non-scientific knowledge systems.

This chapter has demonstrated that further research is needed to understand the impact of the convergence of science and belief. One major concern this history raises is that science adopted non-scientific knowledge without attending to potential ontological conflict or any attempt to evaluate the knowledge system objectively. This problem appears to have led mindfulness into a pragmatic trajectory which shunned the pursuit of causal explanations at its foundation.

The role of the scientist-practitioner is also an under-researched area. In the West, scientists appear to have promoted particular forms of medicalised meditation connected to

their convictions, giving rise to the potential for experimental bias. However, this problem is not visible in scientific engagement with meditation in Japan and India, as illustrated in the previous chapter. These situations lead to a tentative conclusion that science and the production of knowledge are subject to overarching mechanisms which are culturally situated. The degree to which a dualistic understanding of mind and matter is embedded in any community will influence ways of knowing, and this can lead to major problems in the reliable circulation of knowledge between societies.

The scientific understanding of the effects of meditation made progress throughout the 1970s without achieving major breakthroughs. Wallace's new direction had turned meditation research towards exciting clinical application of techniques. This trajectory presented Kabat-Zinn with a platform to take medicalisation one step further, creating a Westernised meditation method that could be deployed pragmatically without the need for protracted experimental work to establish a causal link between mindfulness and improved health. However, there is jeopardy in this approach because, without testable hypotheses, robust scientific validation is unlikely, which in turn increases the risk of limitations caused by factors other than the meditation intervention, such as placebo or positive social engagement. In addition, the experimental reliability of medicalised mindfulness research was problematic from the outset, influencing the MBSR paradigm.

Chapter 4: Consolidation and Proliferation: 1986 to 1990

1. Introduction

Chapter 3 illustrated the growth in the medicalised meditation movement, which led to the development of MBSR. There are clear interconnections between TM, RR and MBSR. Benson and Wallace worked together very briefly, and Kabat-Zinn acknowledged Benson's feedback in the 1982 study.[1] By the mid-1980s, the social conditions supporting medicalised meditation's growth were declining. Scientific criticism of TM research and a decline in Counter-culture values led to changes in the status and acceptance of belief-based practices in scientific contexts.[2] Concerns about the reliability of TM research had been growing since the late 1970s, and there were signs of a pushback to the theoretical and methodological freedom that characterised meditation research during the 1970s.[3] As discussed in Chapter 3, Robert Woolfolk was already urging a shift towards more robust scientific approaches and the development of testable hypotheses in his 1975 review of meditation research. Increasingly critical reviews urged meditation scientists to deliver more robust evidence to support exciting initial claims.[4] A decline in peer-reviewed meditation studies after 1978 (Figure 8) reflected the scientific interest in TM. In this climate, and despite the positive claims made for the benefits of MBSR, there was very little scientific interest in the intervention.

[1] Kabat-Zinn, 'An Outpatient Program in Behavioural Medicine for Chronic Pain Patients Based on the Practice of Mindfulness Meditation: Theoretical Considerations and Preliminary Results'. p. 46.
[2] According to Martine, during the 1980s, there was a resurgence in Protestant movements in the USA, while Eastern spiritual traditions were blended within the wider religious landscape, see Martine Marty, 'Transpositions: American Religion in the 1980s', *The ANNALS of the American Academy of Political and Social Science*, 480.1 (1985), 11–23 <https://doi.org/10.1177/0002716285480001002>.
[3] Woolfolk. pp. 1328–1330.
[4] Several methodological improvements for research into treatments for pain were identified by, Marguerite D. Malone and Michael J. Strube, 'Meta-Analysis of Non-Medical Treatments for Chronic Pain', *Pain*, 34.3 (1988), 231–44 <https://doi.org/10.1016/0304-3959(88)90118-2>.

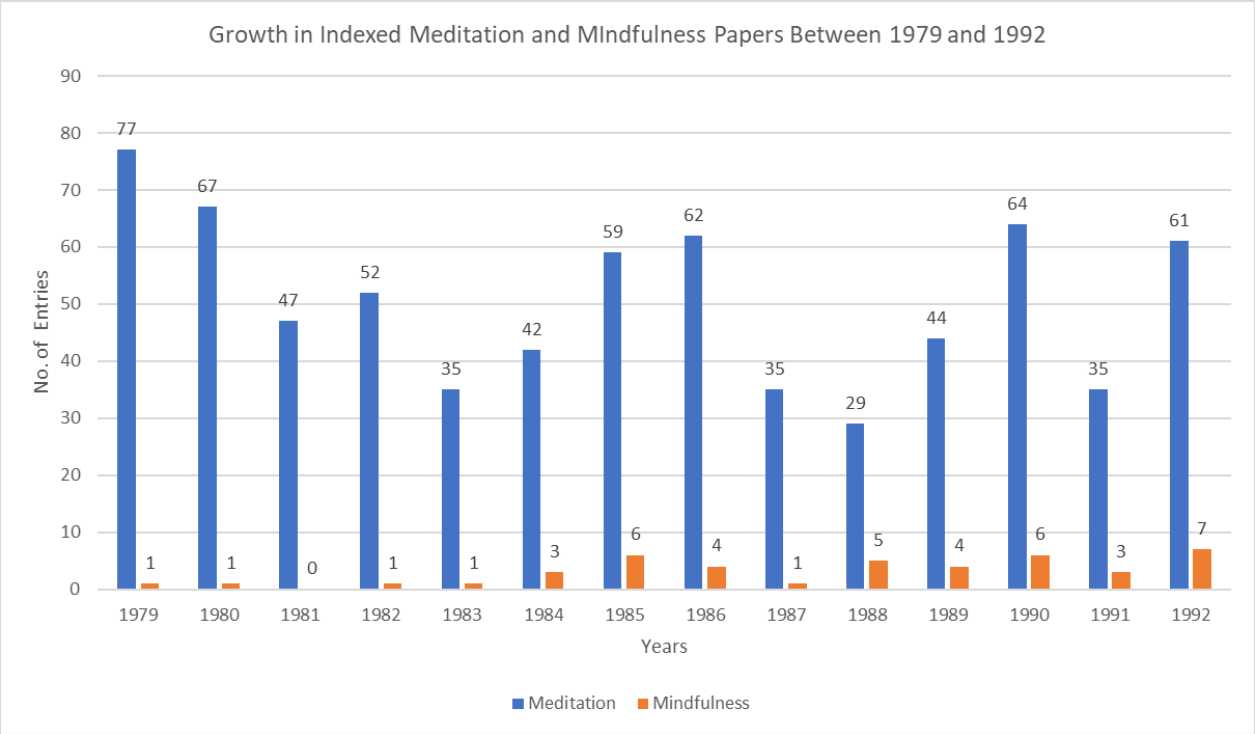

Fig. 8. The total number of entries in the Scopus database with the terms 'meditation' and 'mindfulness' in the abstract, title, or keywords indexed between 1979 and 1992.[5]

As will be described in Section 3, between 1986 and 1990, mindfulness's trajectory transitioned from a belief-based pain treatment to a generic relaxation therapy. During this evolution, advocates positioned MBSR as a solution to multiple health problems. Dramatic claims supported this proliferation, but robust scientific validation was still lacking. Four main themes characterise mindfulness research at this time: i) the positive findings made in preliminary and pilot studies, ii) recurrent methodological limitations, iii) an uncoupling of mindfulness from belief-based knowledge in the scientific literature, and iv) the proliferation of new applications. Kabat-Zinn continued to stress the religious foundations of mindfulness, but typically in non-scientific publications.[6]

[5] Elsevier, Document Search 'meditation' and 'mindfulness', Scopus, 2023 <https://www.scopus.com> [accessed 28 September 2023].
[6] Kabat-Zinn, *Full Catastrophe Living*.

As meditation research matured, it led to the publication of more reviews, many of which took a critical perspective of published papers. In some quarters, the very viability of meditation as a clinical treatment was questioned.[7] Interestingly, several critical reviews of meditation research in the 1970s and 1980s came from the UK and Ireland. Clinicians and scientists such as West, Fenwick, and Michael Delmonte can be characterised as upholders of traditional medico-scientific values, challenging the rising influence of medicalised meditation experiments, typically produced in the USA. Implying a transatlantic divide between medicalised and traditional meditation approaches is an oversimplification. However, it is worth noting that one of the most scientifically robust meditation experiments conducted between 1986 and 1990, discussed in Section 4, was undertaken in Britain by Chandra Patel and others.[8]

MBSR's original belief-based rationale and use in a clinical setting gave it unique characteristics that undoubtedly contributed to its changing role. However, in 1986, the scientific progress of mindfulness should be seen in a wider context. It was still a junior partner in the medicalised meditation movement, and its fortunes were linked to the reputation of meditation research more generally. During the 1980s, an emerging pattern of flawed preliminary research used by scientists and cited in later preliminary studies was a growing limitation. A problem for mindfulness and meditation scientists in the 1980s was that their early investigations made positive claims, largely ignored and sometimes rejected by the scientific mainstream. This tension suggests a conflict between the rationale of early-stage peer-reviewed papers and the values of research reviews and meta-studies. Scientific reviews and meta-studies

[7] Peter Fenwick, 'Can We Still Recommend Meditation?', *British Medical Journal (Clinical Research Ed.)*, 287.6403 (1983), 1401.
[8] Chandra Patel and others, 'Trial of Relaxation in Reducing Coronary Risk: Four Year Follow Up.', *Br Med J (Clin Res Ed)*, 290.6475 (1985), 1103–6 <https://doi.org/10.1136/bmj.290.6475.1103>.

offer synthesised accounts of whole research fields and should present reliable summaries.[9] However, calls made for improvements in meditation experiments in the 1970s had little effect on the overall quality of meditation research in the 1980s. Much tentative MBSR research was presented as potentially reliable and influenced later work. For example, an article of correspondence published in the *Journal of the American Academy of Dermatology* that described a preliminary experiment was cited in later papers despite methodological flaws.[10] One of the goals of this chapter is to explore the different forces that impacted scientific progress rather than accept simple dichotomies of 'good' or 'bad' science. First, however, it is important to provide a context to understand the claims and counterclaims linked to meditation and mindfulness research. There is a consensus in the scientific literature on establishing robust experimental findings when investigating new treatments and therapies, for example, by using Randomised Controlled Trials (RCTs).[11] Eduardo Hariton and Joseph Locascio summarised the value of the RCT rationale in their 2018 review:

> RCTs are prospective studies that measure the effectiveness of a new intervention or treatment. Although no study is likely on its own to prove causality, randomization reduces bias and provides a rigorous tool to examine cause-effect relationships between an intervention and outcome.[12]

[9] Emily Alden Hennessy, Blair T. Johnson, and Ciara Keenan, 'Best Practice Guidelines and Essential Methodological Steps to Conduct Rigorous and Systematic Meta-Reviews', *Applied Psychology. Health and Well-Being*, 11.3 (2019), 353–81 <https://doi.org/10.1111/aphw.12169>.
[10] Jeffery D Bernhard, Jean Kristeller, and Jon Kabat-Zinn, 'Effectiveness of Relaxation and Visualization Techniques as an Adjunct to Phototherapy and Photochemotherapy of Psoriasis', *Journal of the American Academy of Dermatology*, 19.3 (1988), 572–74 <https://doi.org/10.1016/s0190-9622(88)80329-3>.[accessed 2 July 2022].
[11] Eduardo Hariton and Joseph J. Locascio, 'Randomised Controlled Trials—the Gold Standard for Effectiveness Research', *BJOG : An International Journal of Obstetrics and Gynaecology*, 125.13 (2018), 1716 <https://doi.org/10.1111/1471-0528.15199>.
[12] Hariton and Locascio.

An authoritative source, NICE, offers research guidelines for including clinical studies in evidence reviews.[13] A summary of the main points here will inform discussions throughout the rest of this chapter and thesis: i) There should be adequate reporting, ii) the methodology must be robust, iii) results should be conclusive, iv) there should be adequate numbers of participants to deliver the relevant statistical power, v) the results should be applied to the relevant population(s), vi) the research should be wholly relevant, vii) the research must not be out of date, viii) the research should not be difficult to understand, and ix) the findings should be consistent. Point ii) 'the methodology must be robust' is somewhat open to interpretation. Still, its meaning appears consistent in the contemplative science literature, that more reliable use of the scientific method, for example, RCTs, delivers more reliable results. When initial experiments are based on methodological limitations but make concrete claims, there is a possibility of confusion over experimental reliability.[14]

To inform further discussions of the promising status of meditation research the 'publication bias' in academic journals should also be noted.[15] Publication bias describes the tendency of peer-reviewed journals to accept studies with positive outcomes and reject investigations that do not demonstrate a clear experimental effect. So, in theory, a preliminary experiment showing positive results may be published, while many similar accounts illustrating no effects might never enter the scientific literature. This form of bias can lead to a misrepresentation of actual scientific potential. So, although the peer-review journal system is central to processes of science creation, it should be seen as part of a much larger system. In these circumstances, strategic reviews (and historical investigations) offer counter-balances to the unreplicated claims made in individual meditation and mindfulness studies. For example,

[13] NICE, 'Reviewing the Evidence', *National Institute for Health and Care Excellence* (NICE, 2023) <https://www.nice.org.uk/process/pmg6/chapter/reviewing-the-evidence> [accessed 2 February 2022].
[14] This confusion or 'hype, was a key finding in the review by Van Dam and others.
[15] For a review of this phenomenon in the psychological sciences see Gregory Francis, 'Publication Bias and the Failure of Replication in Experimental Psychology', *Psychonomic Bulletin & Review*, 19.6 (2012), 975–91 <https://doi.org/10.3758/s13423-012-0322-y>.

in 1985, Delmonte, a health researcher at St. James's Hospital in Dublin, reviewed the literature investigating biomedical indices of meditation practices.[16] He found that the body of evidence as a whole was inconclusive:

> Although there are some contradictory and inconclusive outcomes, there is nevertheless sufficient evidence of interest to warrant further investigation of this area. However, in the meantime, there is no compelling basis to conclude that meditation practice is associated with special state or trait effects at the biochemical level.[17]

Here, Delmonte illustrates the rejection of preliminary claims through a more methodologically authoritative review while acknowledging the promising nature of meditation research. The idea that meditation research was promising, not proven, contributing to the development of the mindfulness crisis will remain a theme throughout this thesis. 'Promising' is a subjective term when used to describe experimental results; it is interpretive and can, therefore, mislead scientists, clinicians and the general public.

In this chapter, landmark scientific papers, meta-studies, strategic reviews, scientific correspondence, and other relevant sources from the late 1980s will be analysed to describe the progress of mindfulness meditation. Section 2 will outline the wider landscape influencing the scientific advancement of meditation and mindfulness research. Mindfulness's scientific progress and trajectory will be illustrated through an analysis of the 1986 review of the clinical use of MBSR, which is in Section 3 below. The 'Four-Year Follow-Up of a Meditation-Based Program for the Self-Regulation of Chronic Pain: Treatment Outcomes and Compliance' was published by Kabat-Zinn, Leslie Lipworth, Robert Burney, and William Sellers.[18] This study is particularly important because it presents an overview of the MBSR project, evaluating the

[16] M. M. Delmonte, 'Biochemical Indices Associated with Meditation Practice: A Literature Review', *Neuroscience and Biobehavioral Reviews*, 9.4 (1985), 557–61 <https://doi.org/10.1016/0149-7634(85)90002-8>.
[17] Delmonte. p. 557.
[18] Kabat-Zinn, Lipworth and others.

results from the 225 patients treated since Kabat-Zinn began using mindfulness in 1979. Its citation in Kabat-Zinn's later work indicates its foundational importance in developing the MBSR paradigm and the trajectory of MBIs.[19] Section 4 describes the proliferation of mindfulness through a discussion and analysis of a preliminary study published in the *Journal of the American Academy of Dermatology* in 1988.[20] Kabat-Zinn joined forces with dermatologist Jeffrey Bernhard and psychologist Jean Kristeller to propose a new psoriasis treatment, using mindfulness as an adjunct to an existing therapy. This paper presented mindfulness as a generic relaxation therapy and illustrates the early proliferation of MBSR into new, scientifically unrelated fields. The chapter's conclusions are presented in Section 5.

2. The Shifting Landscape Facing Scientific Engagement with Mindfulness After 1985

The mindfulness literature clearly shows the changing acceptance of belief-based knowledge in meditation research. Although Kabat-Zinn and colleagues linked mindfulness to spiritual traditions in their 1985 study 'The Clinical Use of Mindfulness Meditation for the Self-regulation of Chronic Pain', the 1986 four-year review did not mention Buddhism, Hinduism, or any spiritual texts.[21] However, Kabat-Zinn continued to claim links between MBSR and Buddhism in his 1990 self-help book *Full Catastrophe Living*:

> MBSR and its "cousins" are expressions, however limited they may be in some regards, of the deep wisdom stemming from practices discovered and refined long ago in India

[19] Bernhard, Kristeller, and Kabat-Zinn.
[20] Bernhard, Kristeller, and Kabat-Zinn.
[21] For details of the 1985 study see Jon Kabat-Zinn, Leslie Lipworth, and Robert Burney, 'The Clinical Use of Mindfulness Meditation for the Self-Regulation of Chronic Pain', *Journal of Behavioral Medicine*, 8.2 (1985), 163–90 <https://doi.org/10.1007/BF00845519>. For details of the 1986 study see J. Kabat-Zinn, Lipworth and others.

> and kept alive and refined further over millennia by multiple traditions—mostly but not exclusively Buddhism—in all the civilizations of Asia. [22]

Kabat-Zinn appears to have placed a different emphasis on the spiritual nature of mindfulness with diverse audiences through various channels. For example, a renowned Buddhist teacher, Thich Nhat Hanh, wrote the foreword to *Full Catastrophe Living.*

Meditation research, as measured by peer-reviewed publications, driven partly by scientific interest in TM, grew rapidly between 1970 and 1978, after which it started declining (Figure 7). The main medicalised practices (TM, RR, and MBSR) followed their own trajectories but were also linked by overarching trends. In the mid-1980s, MBSR was still relatively unknown, even within the field of chronic pain self-regulation. For example, the Google Scholar database has only seven documents indexed that cited Kabat-Zinn's original MBSR pilot study between its publication in 1982 and 1985; four entries were for research projects involving Kabat-Zinn or his fellow advocate for medicalised meditation, Benson.[23]

The enthusiastic reception of Wallace's papers in 1970 helped TM to become a major object of meditation research throughout the 1970s. It accounted for 25 per cent of all studies investigating meditation in some years. However, TM also bore the brunt of criticism directed at medicalised meditation studies.[24] There are signs after 1980 that the TM movement started withdrawing from the mainstream meditation research environment. Increasingly, when scientists published articles demonstrating the benefits of TM, the author's affiliations often led back to TM institutions, such as the Maharishi International University in Iowa.[25] TM

[22] Jon Kabat-Zinn, *Full Catastrophe Living: How to Cope with Stress, Pain, and Illness Using Mindfulness Meditation* (Doubleday, 1990). p. 556.
[23] Google Scholar, 'Citation Search: Jon Kabat-Zinn 1982', *Google Scholar*, 2022 <https://scholar.google.com/scholar?hl=en&as_sdt=2005&sciodt=0%2C5&cites=16075555766756988623&scipsc=&as_ylo=1982&as_yhi=1985> [accessed 21 February 2022].
[24] West, 'Meditation.' p. 458.
[25] Robert Wallace and others, 'Modification of the Paired H Reflex through the Transcendental Meditation and TM-Sidhi Program', *Experimental Neurology*, 79.1 (1983), 77–86 <https://doi.org/10.1016/0014-4886(83)90379-5>.

research became introverted, serving the needs of the TM community as much as contributing to a wider debate about the value of meditation. The growing uneasiness with scientific practices was one factor in the decline in meditation research. West's 1979 critique of the science supporting the progress of TM reflected this more critical reception of medicalised meditation research. West went as far as to claim bias in TM studies: 'Unfortunately, enthusiasm for TM has tended to lead to biased presentations and misleading explanations.'[26] From a historical perspective, these challenges to medicalised approaches give a sense of an attempt by more traditional scientists to restore 'normal service' after the conceptual freedom to test the boundaries between science, health, and belief by medicalised experiments during the early 1970s.

Early meditation studies from the 1960s relied on subjective empirical measures to evaluate the effects of meditation, such as changes in brain waves, blood pressure, and heart rate.[27] Kabat-Zinn took medicalisation in new experimental directions, avoiding using objective measurements as seen in earlier TM and RR experiments. The growing use of psychometrics in psychology during the 1970s had a major impact on the study of meditation. For example, the creation of the Melzack Pain Rating Index (PRI) in 1971 gave scientists new ways, albeit based on subjective data, to evaluate treatment effectiveness.[28] Unlike TM and RR research, MBSR experiments generated data largely obtained from questionnaires. The reliance on self-reported data was not a universal switch, and objective methodologies continued alongside psychometric approaches.

By 1986, mindfulness had been in clinical use for seven years; however, there was still no explicit scientific rationale for the concept. MBSR research started as a live clinical 'service'

[26] West saves his most critical comments on meditation research for TM in West, 'Meditation.' p.458.
[27] Kasamatsu and Hirai, 'An Electrocephenolographic Study on the Zen Meditation (Zazen)'. pp. 316–321.
[28] Ronald Melzack, 'The McGill Pain Questionnaire: Major Properties and Scoring Methods', *Pain*, 1.3 (1975), 277–99 <https://doi.org/10.1016/0304-3959(75)90044-5>.

but has also been described as a trial, pilot, or feasibility study at different times.[29] By not defining mindfulness scientifically, scientists could adopt flexible theoretical and methodological approaches to facilitate its rapid proliferation into new areas. In contrast to the fluidity of MBSR, other scientists were exploring mindfulness from a more traditional perspective. In the 1980s, Ellen Langer's exploration of mindfulness-mindlessness from a Western psychological perspective gained some traction in the scientific literature.[30] This approach considered mindfulness in terms congruent with traditional psychological investigations, for example, exploring the cognitive relationships of mindfulness and mindlessness:

> We drew the distinction between mindful and mindless cognitive activity. When mindful, the individual was presumed to be actively drawing distinctions, making meaning, or creating categories. When mindless, the individual was said to rely on distinctions already drawn. Mindless behavior is rigidly (i.e., single-mindedly) dictated by the past. Therefore, much of the on-going present situation is hypothesized to go unexamined.[31]

In addition to the changing scientific acceptance of meditation research, non-scientific publications may also have been a factor in the trajectory of medicalised meditation. Positive claims about the benefits of meditation techniques in best-selling books likely increased public awareness and appetite for meditation as therapy. However, despite the proliferation and presentation of positive preliminary findings in different media, influential critical studies continued to dispute claims for the benefits of medicalised meditation. David Holmes's 1984

[29] In the 1982 paper Kabat-Zinn described mindfulness as a medical service raising questions about its deployment ahead of evidence of its reliability. Kabat-Zinn, 'An Outpatient Program in Behavioural Medicine for Chronic Pain Patients Based on the Practice of Mindfulness Meditation: Theoretical Considerations and Preliminary Results'. p. 33.

[30] For a discussion of Langer's progress during the 1980s, see Ellen J Langer, 'Matters of Mind: Mindfulness/Mindlessness in Perspective', *Consciousness and Cognition*, 1.3 (1992), 289–305 <https://doi.org/10.1016/1053-8100(92)90066-J>.

[31] Ellen J. Langer, Benzion Chanowitz, and Arthur Blank, 'Mindlessness–Mindfulness in Perspective: A Reply to Valerie Folkes', *Journal of Personality and Social Psychology*, 48.3 (1985), 605–7 <https://doi.org/10.1037/0022-3514.48.3.605>. p. 605.

scientific review, published in *American Psychologist,* argued that meditation did not mediate arousal, challenging a foundational finding of meditation research.[32] Claims that the RR could lower arousal had been established by experimental studies and were published by Benson and Miriam Klipper in a self-help book in 1976; they had become part of the meditation narrative.[33] The *Relaxation Response* became the first book in a successful series, selling millions of copies.[34] By 1990, Kabat-Zinn was also on track to become a successful self-help author following the publication of *Full Catastrophe Living*.[35] Despite its commercial success, *Full Catastrophe Living*'s short-term impact on scientific interest was minimal, with the dramatic growth in published mindfulness research taking place after 2003. However, it seems likely that claims in popular self-help books may have contributed to the interest in mindfulness and possibly the 'hype' discussed in Chapter 7.

3. Mindfulness in 1986, Validating the Original Concept

The following section analyses the 1986 MBSR study published in the Clinical Journal of Pain.[36] Lipworth, Burney and Sellers co-authored the paper alongside Kabat-Zinn. Perhaps surprisingly, the term mindfulness did not appear in the study's title. This 1986 paper aggregated the data from all the published MBSR experiments up to that point and marks the end of the first stage of scientific engagement with MBSR.[37] This review was designed to

[32] Holmes.
[33] Herbert Benson and Miriam Klipper, *The Relaxation Response* (New York: Collins, 1976), p. 158.
[34] Among the books written by Benson linked to his research The Relaxation Response alone sold more than six million copies. 'The Relaxation Response', *HarperCollins* <https://www.harpercollins.com/products/the-relaxation-response-herbert-bensonmiriam-z-klipper> [accessed 5 January 2022].
[35] Kabat-Zinn, *Full Catastrophe Living*.
[36] Kabat-Zinn, Lipworth and others.
[37] Kabat-Zinn, Lipworth and others. p. 161

aggregate and confirm the benefits of the intervention. However, a key function was also to evaluate the long-term effects of MBSR on regulating pain.

The SR&RP delivered mindfulness training to outpatients in a hospital clinic to support them in managing chronic pain. Patients attended the clinic for eight or ten weeks and were trained in the three elements of MBSR: meditation, breathing, and posture yoga.[38] Patients received instruction in the clinic and were given 'homework' to consolidate their practice. MBSR offered long-term support in pain management; patients could continue with all or some elements of the training after the treatment phase ended, often for years. The objective of the four-year follow-up was to evaluate the effectiveness of MBSR at all stages of the treatment cycle. The study's first declared research goal emphasised the PRI metric; it was to 'Determine the time course up to 4 years post-intervention of the mean levels on the pain [PRI BPPA] physical and psychological symptoms and overall outcome (OA) measures used to assess change during the intervention.'[39]

In the paper, Kabat-Zinn and others describe demographic and clinical considerations, then set out methods of patient referral and details of the different kinds of pain patients attending the program experienced.[40] The review captured the patients' experience of pain before and after treatment and ongoing self-assessment of pain and psychological states. [41] A battery of annual questionnaires was sent to all those who had completed the training. Patients submitted data on several indices in addition to the PRI: 'These questionnaires contained the McGill Melzack Pain Rating Index (PRI), the Body Parts Problem Assessment Scale (BPPA), a Medical Symptom Checklist (MSCL), the SCL-90-R, an overall change measure (OA), and a section on compliance.'[42]

[38] Kabat-Zinn, Lipworth and others.
[39] Kabat-Zinn, Lipworth and others. p. 160.
[40] Kabat-Zinn, Lipworth and others. pp. 159–160.
[41] Kabat-Zinn, Lipworth and others. p. 161.
[42] Kabat-Zinn, Lipworth and others. pp. 160–161.

The way the data was generated and handled had some distinctive characteristics. Patients were treated on a rolling basis over three and a half years, adding complexity to the statistical analysis. This methodology meant that the four-year follow-up data came from different times, increasing the potential of uncontrolled factors influencing outcomes. In addition, there was a transition between a 10-week and 8-week mindfulness program sometime after the publication of the 1985 study.[43] When analysed, the results evidenced the enduring benefits of the treatment and the high compliance rates (the extent to which patients continued mindfulness practice post-treatment).[44] The study's conclusions were positive:

> This study confirmed an earlier finding that large and significant improvements in measures of negative body image (BPPA), medical symptoms (MCSL), global psychological symptomology (GSI), and overall improvement (OA) can be obtained in such a program by a chronic pain outpatient population over an 8-week intervention period.[45]

There were fewer references to the uncontrolled nature of the research compared to the original 1982 study. Hence, its preliminary status and the paper's abstract stated the long-term benefits of practising MBSR: 'We conclude that such training can have long-term benefits for chronic pain patients.'[46]

The amount of attention committed to compliance in this investigation is noteworthy. Two of the eight objectives of the study were to establish to what extent patients continued to practice mindfulness after receiving the initial training and to what effect. Kabat-Zinn and others reported that:

[43] The 1985 study is still referring to a 10 week programme, Kabat-Zinn, Lipworth, and Burney. p.166. But by 1986 the study length has been reduced to 8 weeks. Kabat-Zinn, Lipworth and others. p. 160.
[44] Kabat-Zinn, Lipworth and others. p. 160.
[45] Kabat-Zinn, Lipworth and others. p. 172.
[46] Kabat-Zinn, Lipworth and others. p. 159.

> This four-year follow-up study also extended our earlier observation that pain patients continued to adhere to a combination of formal and informal uses of meditative techniques and the yoga in which they were trained in the SR&RP. Between 58 and 83% of responders at the various follow-up times reported that they continued to meditate at the time of inquiry, while over 93% reported using at least one of the techniques at least some of the time.[47]

The study was designed to investigate if MBSR training reduced the subjective experience of pain beyond the treatment phase of the project. But a notable absence from these positive results were changes over time to the PRI, probably the most important measure of patient experience of pain:

> 'However, the response to the PRI differed notably from that of the other indices. The mean PRI level achieved post-intervention was not reliably maintained over the period of follow-up and tended to return to the pre-intervention level within six months as reported previously.'[48]

Given the emphasis on demonstrating the longevity of the therapeutic benefits, the PRI's return to pre-treatment levels was problematic. If patients continued to practice MBSR but did not retain a reduced experience of pain after the treatment period, then factors other than meditation, such as placebo or the empathy of clinicians, may have been causing the improvements, a scenario described by Malone and Strube in their 1988 review of non-medical chronic pain interventions:

> This evidence suggests that the effectiveness of these treatments may be attributable not to the differences between treatments, but to the features they share in common, for example, the identification of psychological factors which exacerbate pain, contact with an empathic professional, and installation of hope for relief from symptoms. [49]

[47] Kabat-Zinn, Lipworth and others. p. 168.
[48] Kabat-Zinn, Lipworth and others. p. 172.
[49] Malone and Strube. p. 236.

Potential mitigation presented in the paper for this result was that the reliability of the PRI data might have been compromised during collection: 'This may be due to a change in method of administration of the measure at follow-up.'[50] This level of uncertainty should have led to caution in the claims of the long-term benefits of MBSR.

There is a clear determination in the paper to demonstrate that once learned, MBSR could continue to offer meaningful benefits beyond the original intervention in the clinic—a significant advantage in the treatment of long-term health conditions. The data (PRI findings aside) supported this view. However, experimental results indicated that patients reporting low levels of compliance experienced some improvements, suggesting that factors other than MBSR practice may have influenced the results over time. Or perhaps the relationship between mindfulness and chronic pain was more nuanced than the findings suggested. These problems are directly related to a failure to establish causal mechanisms and other methodological issues. A major limitation in MBSR research was a failure to attempt to confirm the presence of meditative states and traits through physiological measurements, even though this was a common approach in meditation research.[51] For example, showing a relationship between mindfulness and a reduced heart rate would have provided some objective evidence that mindfulness produced an effect. If such an effect was observed during MBSR training, it could be hypothesised that MBSR did (or did not) reduce heart rate, which could be linked to health benefits. The study's authors acknowledged the limitation of using subjective data: 'Self-reported questionnaires are intrinsically limited and open to response bias of particular kinds.'[52] However, this obvious problem did not temper their enthusiasm or claims for MBSR.

[50] Kabat-Zinn, Lipworth and others. p. 167.
[51] For examples of physiological measures in meditation research see Wallace and Benson.
[52] Kabat-Zinn, Lipworth and others. p. 172.

Although not discussed in the conclusions or abstract, the treatment led to an increase in reported pain in a few patients: 'A small fraction (1-15%) of the population experienced a worsening of pain status, and approximately 25% reported no change in pain status since taking the SR&RP.'[53] There are two issues to highlight: firstly, the ethical basis of administering a treatment ahead of data to demonstrate its safety or effectiveness. Secondly, the value of understanding why the treatment failed to produce any change or had a negative effect. The focus on net positive outcomes reflects the pragmatic approach many advocates of medicalised mindfulness adopted; knowing why MBCT did not always work or made things worse could have provided useful insights. The claims made in the 1986 follow-up were less tentative than the earlier MBSR studies, even though the same and sometimes greater methodological limitations were present (such as the PRI uncertainty). Expressing confidence about preliminary claims became integrated into the mindfulness paradigm.

The 1986 investigation was described as an 'observational study', a form of investigation unlikely to support firm conclusions: 'While this observational study suffers from some of these difficulties, and in particular the lack of a comparison control group and the reliance on self-reported data.'[54] This insight is at odds with the paper's recommendations, which showed little caution: 'We conclude that mindfulness meditation training in the context of stress reduction results in long-term improvements of an ambulatory chronic pain population, continued compliance with the techniques, and reports of high patient satisfaction with the intervention.'[55] In their 2009 discussion of the utility of observational studies, Melissa Carlson and Sean Morrison encouraged restraint in dealing with observational data:

> It is therefore important for readers of observational research to consider if alternative explanations for study results exist. This issue (known as "confounding") is a primary

[53] Kabat-Zinn, Lipworth and others. pp. 161–162.
[54] Kabat-Zinn, Lipworth, Burney, and others. p.167.
[55] Kabat-Zinn, Lipworth, Burney, and others. p. 173.

challenge of observational research and will be discussed in detail in the next paper in this series.[56]

The scientists acknowledged there were methodological limitations in the MBSR studies published from 1982. Additionally, new problems were introduced in this paper, such as the uncertainty of PRI data collection. However, mindfulness scientists projected a strong degree of confidence in their results.

It could be argued that some of the critical evaluations of the MBSR four-year review are informed by hindsight. However, a comparative illustration of a more robust methodology in another four-year follow-up study was the 1985 controlled trial conducted by Chandra Patel and others.[57] This paper demonstrates the continued presence of traditional scientific values in meditation research and some differences between conventional and medicalised approaches. Patel was a UK-based general practitioner (GP) who worked in the Department of Medical Statistics and Epidemiology at London's School of Hygiene and Tropical Medicine. He and his co-authors wanted to test non-pharmacological methods of lowering blood pressure and thus reducing coronary risk. All the researchers shared an interest in public health, and grants from the South West Thames Regional Health Authority and the British Heart Foundation supported the experiments. [58]

The methodology followed the principles of an RCT. In total, 1132 participants were allocated randomly to an experimental group (receiving the treatment) or a control group (receiving similar advice, instructions, and examinations but without the treatment). [59] The treatment was to practice relaxation and meditation:

[56] Melissa D.A. Carlson and R. Sean Morrison, 'Study Design, Precision, and Validity in Observational Studies', *Journal of Palliative Medicine*, 12.1 (2009), 77–82 <https://doi.org/10.1089/jpm.2008.9690>. [accessed 13 January 2023]. p. 78.
[57] Patel and others. p. 1106.
[58] Patel and others.
[59] Patel and others. p. 1104.

They were asked to practise relaxation and meditation for 15-20 minutes twice daily and to try to relax during everyday activities, such as while waiting at red traffic lights, before picking up a telephone, and every time they looked at their wrist watches. The subjects were lent a tape recording on relaxation to use at home. [60]

Objective and self-reported values for blood pressure, plasma cholesterol and cigarette consumption were gathered from the control and experimental groups. Data was collected at the start of the pilot, and after eight weeks, eight months, and four years, the data suggests that the intervention was successful (Figure 9).

TABLE II—*Blood pressure, plasma cholesterol concentration, and cigarette consumption in treatment and control groups at each examination*

	Initial	8 weeks	8 months	4 years
		Blood pressure		
Mean (SD) systolic pressure (mm Hg):				
Treatment group (n = 86)	146·5 (26·3)	132·0 (21·2)	130·3 (18·8)	139·4 (22·4)
Control group (n = 75)	144·1 (22·8)	140·2 (17·4)	139·1 (16·9)	145·7 (21·0)
p				0·015
Mean (SD) diastolic pressure (mm Hg):				
Treatment group (n = 86)	87·9 (15·2)	80·5 (13·0)	81·1 (11·4)	85·2 (13·6)
Control group (n = 75)	88·3 (12·3)	86·6 (10·8)	88·0 (11·4)	92·4 (12·8)
p				0·001
		Plasma cholesterol		
All subjects:				
Treatment group (n = 86)†	6·95 (0·92)	6·24 (1·13)	6·32 (1·00)	7·03 (1·25)
Control group (n = 75)‡	7·07 (1·00)	6·49 (1·39)	6·43 (1·15)	6·90 (1·16)
p		0·429	0·945	0·129
Initial concentration ⩾6·3 mmol/l:				
Treatment group (n = 74)§	7·19 (0·73)	6·30 (1·09)	6·43 (0·95)	7·13 (1·23)
Control group (n = 67)‖	7·27 (0·87)	6·73 (1·26)	6·62 (1·05)	7·09 (1·05)
p		0·051	0·451	0·587
		Smoking		
No (%) subjects stopped:				
Treatment group		9 (11·1)	8 (10·4)	20 (28·6)
Control group		5 (7·8)	3 (5·4)	13 (23·6)
No (%) subjects reduced:				
Treatment group		55 (55·6)**	52 (54·7)**	53 (60·9)
Control group		25 (27·2)	21 (25·3)	39 (48·1)
Reduction in No of cigarettes smoked/day:				
Treatment group		5·8**	4·8*	7·1
Control group		2·6	2·3	6·8

*p < 0·05; **p < 0·01.
†Values missing in one subject at eight weeks and three subjects at eight months and four years, respectively.
‡Values missing in two, six, and four subjects at eight weeks, eight months, and four years, respectively.
§Values missing in one, two, and three subjects at eight weeks, eight months, and four years, respectively.
‖Values missing in two, five, and three subjects at eight weeks, eight months, and four years, respectively.
Conversion: SI tc traditional units—Cholesterol: 1 mmol/l ≈ 38·6 mg/100 ml.

Fig. 9. Table II from the 1985 study by Patel and others.[61]

[60] Patel and others. p. 1103–1105.
[61] Patel and others. p. 1104.

Although this study is methodologically superior to the MBSR four-year review, a limitation of this approach was the use of different relaxation techniques in the treatment group and control group; thus, the health benefits of individual practices were not established. Despite the quality of the experiments, the study's authors made clear they had not established how or even if meditation led to improved patient outcomes:

> Although an association between compliance and the meditation practices and improvement in status was found, quantitative measures of therapeutic efficacy cannot be ascribed to individual components of the intervention, including the meditation techniques, in this type of study.[62]

Although comparing scientific papers is not a simple matter, the contrast between the MBSR review and the study by Patel and others reveals two important differences. MBSR research was methodologically weaker but made more positive claims about the technique; these two elements became embedded in the Kabat-Zinn mindfulness paradigm. Despite the success described by Kabat-Zinn and others, the pain and meditation communities paid little immediate attention to the 1986 results; the Google Scholar index records only two citations of that paper over the following five years, studies that Kabat-Zinn co-authored in 1988.[63] The presence of known limitations in mindfulness research does not appear to have restricted its relocation into other contexts after 1985.

[62] In this context, 'OA' is an abbreviation for 'overall change measure' explained on page 160 of the paper. Kabat-Zinn, Lipworth and others. p. 171.

[63] See Bernhard, Kristeller, and Kabat-Zinn. and Jon Kabat-Zinn and Ann Chapman-Waldrop, 'Compliance with an Outpatient Stress Reduction Program: Rates and Predictors of Program Completion', *Journal of Behavioral Medicine*, 11.4 (1988), 333–52 <https://doi.org/10.1007/BF00844934>. [accessed 3 February 2023].

4. To Control or Not to Control? Methodological Uncertainty in Meditation Research

Two important elements of greater experimental reliability in the study by Patel and others were the randomisation of participants and, secondly, the use of controls to establish comparative data against which to evaluate the data generated by the experimental group and, thus the effect of the treatment.[64] Control groups establish baseline data, illustrating what happens to people who are part of the experiment but do not receive the intervention. During the 1980s, the value of control groups was well established. In their 1980 meta-analysis of research into headaches and migraine pain, Edward Blanchard and colleagues stressed the need for control group data to evaluate treatment effectiveness.[65] Although Kabat-Zinn did not have a clinical background, he knew that a lack of controls would limit the reliability of mindfulness studies. He concluded his 1982 paper with this acknowledgement:

> While this work does not prove that the meditation practice is directly responsible for these changes, it does suggest it. A methodologically stringent placebo-controlled study is in the design stage to test the hypothesis that the major therapeutic benefits stem from the meditation practice itself.[66]

An attempt was made to present comparative data in the 1985 MBSR paper. Still, the comparison was of limited value because of the low numbers of patients receiving different interventions under different conditions.[67]

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[64] Patel and others.
[65] Edward B. Blanchard and others, 'Migraine and Tension Headache: A Meta-Analytic Review', *Behavior Therapy*, 11.5 (1980), 613–31 <https://doi.org/10.1016/S0005-7894(80)80001-3>.[accessed 18 December 2021].
[66] Kabat-Zinn, 'An Outpatient Program in Behavioural Medicine for Chronic Pain Patients Based on the Practice of Mindfulness Meditation: Theoretical Considerations and Preliminary Results'.
[67] Kabat-Zinn, Lipworth, and Burney.

One major advantage of control measures in experiments is that they can provide a context for experimental data and help protect against confounds such as placebo effects. Malone and Strube demonstrated that a pill placebo, sometimes used as a control measure in chronic pain studies, achieved better patient outcomes than some interventions: 'In contrast to Blanchard et al.'s review of headache studies, we found pill placebo to be more consistently effective than biofeedback or relaxation training. Consistent with their study, we found autogenic training to be slightly better than pill placebo'.[68]

In the Malone and Straube paper, mindfulness results were included in the autogenic training category. The mean effect size of autogenic training recorded in the study was 2.74, compared to 2.23 for the placebo. That strong effect recorded for the pill placebo illustrates both the power of the placebo effect and the need for control measures; a placebo effect would likely manifest in control and experimental groups, allowing the impact of an intervention, such as MBSR, to be isolated from other factors. Malone and Strube reported that dramatic results were not restricted to MBSR and were common across the 109 studies in their analysis: 'In the reviewed studies, all treatments were reported as extremely successful when compared with the estimated outcome effects of no-treatment control groups.'[69] So, in this context, the approach adopted by MBSR researchers was not uncommon in that field at that time.

5. Early Proliferation of Mindfulness Ahead of Scientific Validation

The 1986 four-year review of MBSR was the end of the first stage of medicalising the intervention. Describing the growth of mindfulness to 1990 offers insight into the long-term trajectory of the intervention. Langarian mindfulness features prominently in the literature

[68] Malone and Strube. p. 234.
[69] Malone and Strube. p. 233.

during this period, and researchers made progress in developing the concept from traditional psychological perspectives: 'Now that we have a better understanding of the different forms information processing may take, it becomes important to consider the consequences of whether the information is processed mindfully or mindlessly.'[70] The lack of significant interest from the wider scientific community in MBSR as a treatment for chronic pain may have prompted Kabat-Zinn to migrate the mindfulness concept into new, scientifically unrelated areas. Therefore, proliferation may have been a reaction to indifference to MBSR or an attempt to find more convincing evidence of the benefits of mindfulness set against increasing pushback from the mainstream scientific community to medicalised research.[71]

Using 'Kabat-Zinn' as the search term, an interrogation of the Google Scholar database illustrates the progress of the mindfulness project up to 1990.[72] During this time, numerous mindfulness papers, academic poster presentations, and mindfulness books were connected to Kabat-Zinn. (Appendix A). Of the 16 items contained in the search, five are linked to the treatments offered at the SR&RC, including the papers reviewed above. A concerted effort to develop new mindfulness applications in areas such as elite sporting performance, lifestyle changes, counselling, anxiety and psoriasis treatment is visible at this time. Many of these projects were speculative and did not lead to pilot studies or the publication of peer-reviewed papers. One result of this proliferation, including the publication of self-help books, was the promotion of mindfulness through different media to different audiences ahead of robust scientific validation.

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[70] Ellen J. Langer, 'Minding Matters: The Consequences of Mindlessness–Mindfulness', in *Advances in Experimental Social Psychology*, ed. by Leonard Berkowitz (Academic Press, 1989), XXII, 137–73 <https://doi.org/10.1016/S0065-2601(08)60307-X> [accessed 11 March 2023]. p. 137.

[71] Holmes. p. 1.

[72] Google Scholar, 'Citation Search: Jon Kabat-Zinn', Google Scholar, 2023 <https://scholar.google.com/scholar?q=jon+Kabat-Zinn&hl=en&as_sdt=0%2C5&as_ylo=1982&as_yhi=1990> [accessed 08 October 2023].

A significant benefit of claiming the success of MBSR without establishing a testable hypothesis or a viable theoretical framework appears to be its flexibility. The fluidity of the mindfulness concept and the pragmatic rationale adopted by Kabat-Zinn created the potential for the practice to be widely relocated because it was not rooted in a particular cognitive process or linked to a specific health outcome. The 1986 MBSR review inferred a connection between mindfulness and the RR.[73] Drawing mindfulness into alignment with Benson's hypothesis supported the reshaping of the MBSR as a generic relaxation technique. However, experimental work was being undertaken to prove the hypothesis on which the RR was based. In contrast, mindfulness research was less interested in establishing a scientific understanding of the intervention or how it worked.

In 1986, there was still a great deal of work necessary to scientifically validate MBSR as a treatment for chronic pain. Still, Kabat-Zinn was busy promoting new promising applications for mindfulness. The scope of projects mindfulness was linked with between 1985 and 1990 indicates uncontrolled and rapid expansion. By analysing the 1988 experiment where mindfulness was used as an adjunct in treating psoriasis as a case study, the way mindfulness was proliferated will be brought into clearer focus.[74] In January 1988, Susan Winchell and Royce Watts published an article discussing a potential relationship between relaxation and successful treatments for skin conditions in the *Journal of the American Academy of Dermatology*:

> Relaxation and mere suggestion also affect the autonomic nervous system and the immune system and therefore may affect the course of the skin disorder. A few case studies have documented successful treatment of psoriasis with hypnosis and biofeedback.'[75]

[73] Kabat-Zinn, Lipworth and others. p. 159.
[74] Bernhard, Kristeller, and Kabat-Zinn.
[75] Susan A. Winchell and Royce A. Watts, 'Relaxation Therapies in the Treatment of Psoriasis and Possible Pathophysiologic Mechanisms', *Journal of the American Academy of Dermatology*, 18.1 (1988), 101–4 <https://doi.org/10.1016/S0190-9622(88)70015-8>.

In the correspondence section of the September 1988 issue of the same journal, Jeffrey Bernhard, Jean Kristeller, and Kabat-Zinn reported the first results of a preliminary study of meditation in treating psoriasis.[76] Bernhard and others found that some psoriasis treatments used ultraviolet (UV) light (phototherapy and photochemotherapy), leaving patients in isolation, a situation where meditation or relaxation could be practised.[77] They saw a role here for mindfulness:

> Recently we began a study to assess the utility of meditation and visualization techniques as adjuncts to phototherapy and photochemotherapy (PUVA) in the treatment of psoriasis. We believed that the time spent in the isolation of an ultraviolet treatment unit could be ideal for patients to learn and engage in meditation and visualization strategies under the guidance of instructional audiocassette tapes.[78]

Bernhard and others developed a pilot study by combining two preliminary hypotheses: that mindfulness could induce relaxed states, which could help treat psoriasis. The treatment method took mindfulness into new clinical areas using new techniques: audiocassette guidance of a visualisation technique and: 'mindful focusing on breathing, proprioception, and music.'[79] The account describes a randomised trial at a very early stage: 'To date 12 patients have entered the study and completed the protocol. Eight were randomized to receive the tape intervention, and four underwent conventional treatment without the tape.'[80] The benefits of the treatment were established by the number of sessions required to achieve, in the opinion of a clinic nurse, a turning point (a 50 per cent 'clearing' of the treated skin) and a clearing point (a 95 per cent

[76] Bernhard, Kristeller, and Kabat-Zinn.
[77] For details of the treatments rationales present in the mid-1980s see E. M. Farber, E. A. Abel, and A. Charuworn, 'Recent Advances in the Treatment of Psoriasis', *Journal of the American Academy of Dermatology*, 8.3 (1983), 311–21 <https://doi.org/10.1016/s0190-9622(83)70033-2>. (accessed 19 January 2022).
[78] Bernhard, Kristeller, and Kabat-Zinn. p. 572.
[79] Bernhard, Kristeller, and Kabat-Zinn. p. 573.
[80] Bernhard, Kristeller, and Kabat-Zinn. p. 573.

'clearing' of the treated skin). Although this method was somewhat subjective, the results were significant. The meditation/relaxation group reached the turning point in 8.4 (mean) treatments compared to the control group's progress of 16.3 (mean) treatments. The number of treatments needed to reach the clearing point was also fewer, 95 per cent clearing in a mean of 18.9 treatment sessions, whereas only one patient in the control group achieved clearing in less than 40 sessions.'[81]

The potential halving of treatment sessions required to achieve the 'clearing point' appears to offer a major clinical improvement. But surprisingly, this promising pilot was not followed up for a decade. Kabat-Zinn and others published a further study in 1998, but a low number of participants completing the treatment (23) did not provide the major clinical review necessary to validate the original concept.[82] This early example of proliferation supports the general pattern seen in the earlier uses of MBSR, promising preliminary results that were frequently unreplicated.

A close reading of the psoriasis study provides insights into mindfulness's trajectory. Firstly, Kabat-Zinn aligned himself with experts in this study (or possibly vice-versa); Jeffrey Bernhard is a dermatologist with a clinical interest in psoriasis.[83] Jean Kristeller is a psychologist with extensive academic experience in TM, Zen, and the RR.[84] Bernhard and Kristeller had the medical, clinical, and psychological training that Kabat-Zinn lacked and thus would have given the investigation greater credibility. The study used randomisation, which may have strengthened the scientific basis of the claims made had the sample size been greater. The results were established through the subjective opinion of a nurse; in such a small sample

[81] Bernhard, Kristeller, and Kabat-Zinn. p. 573.
[82] Jon Kabat-Zinn, Elizabeth Wheeler, and others, 'Influence of a Mindfulness Meditation-Based Stress Reduction Intervention on Rates of Skin Clearing in Patients With Moderate to Severe Psoriasis Undergoing Photo Therapy (UVB) and Photochemotherapy (PUVA)', *Psychosomatic Medicine*, 60.5 (1998), 625–32.
[83] John W. Melski, Jeffrey D. Bernhard, and Robert S. Stern, 'The Koebner (Isomorphic) Response in Psoriasis: Associations With Early Age at Onset and Multiple Previous Therapies', *Archives of Dermatology*, 119.8 (1983), 655–59 <https://doi.org/10.1001/archderm.1983.01650320029011>.
[84] Jean Kristeller, 'About Jean', *Mindful Eating*, 2022 <https://www.mb-eat.com/> [accessed 21 January 2022].

size, even modest errors of judgment could influence the findings. The experimental design did not lead to an increased scientific understanding of the potential of mindfulness; without a working model of what part(s) of the intervention supported the healing process, scientifically validating the findings would be challenging. In addition, the control group was not offered an adequate controlled intervention (alternative cassette-based training, for example), which could have minimised the effects of confounding variables. The pragmatic approach used in this pilot study was the hallmark of using MBSR in treating chronic pain and became embedded in the Kabat-Zinn mindfulness paradigm.

The treatment used was a radical departure from the original MBSR training method. It included focusing on the breath, use of music, proprioception (kinaesthesia, a sense of one's movement/location), and visualisation. The rationale for this eclectic mix of elements in the treatment was not described in the correspondence, nor was the role of mindfulness in mediating cognitive processes and their impact on psoriasis. Mindfulness appears to have been used to help create a generalised relaxed state, which was presumed to increase the effectiveness of psoriasis treatment. This rationale supports the hypothesis that the post-1985 direction of mindfulness positioned it as both a treatment-specific intervention, as with the treatment of chronic pain, and a relaxation method that could act as an adjunct to other treatments, as with psoriasis.

Winchell and Watts replied to Bernhard's correspondence in the same edition of the Journal of the American Academy of Dermatology.[85] Among the points they made was that they were conducting an almost identical study to that described by Bernhard and others: 'Our first pilot study involved seven outpatients with psoriasis receiving weekly sessions of relaxation and hypnosis. In addition, each patient received an audiocassette containing

[85] Bernhard, Kristeller, and Kabat-Zinn. p. 573.

relaxation and guided imagery.'[86] The similarities between the two unconventional treatments are striking and worthy of more detailed research, which is not possible here. The use of mindfulness in treating psoriasis illustrates a huge potential to adapt to different clinical settings without needing a stable theoretical framework or established methodology. Why Kabat-Zinn and colleagues wrote up the initial stage of a preliminary experiment and published it in the correspondence section of a journal rather than complete the investigations and submit a full journal article is unclear.

The approach adopted in the psoriasis study was a dramatic departure from Kabat-Zinn's earlier work. After 1985, Kabat-Zinn found collaborators willing to help him pilot mindfulness in new directions. By 1988, the scientific literature indicates mindfulness had become secular and pragmatic, uncoupled from any theoretical framework or spiritual rationale that could systematically explain its curative potential. These conceptual freedoms were key characteristics in the trajectory of mindfulness and underpinned its expansion into new areas.

6. Conclusions

An overview of the development of mindfulness research from this period reveals four intertwined themes: positive preliminary findings, methodological limitations, an uncoupling from belief-based knowledge, and proliferation of the intervention. Although MBSR research was conducted through the SR&RP, there was little direct scientific interest in the psychological construct of stress in Kabat-Zinn's work. However, after 1985, MBSR leaned closer to Benson's RR and was presented as a condition-specific treatment and a generic relaxation therapy.

[86] Bernhard, Kristeller, and Kabat-Zinn. p. 573.

The forces that influenced the direction of mindfulness post-1985 were varied and not always explicit. Medicalised meditation research came under sustained critical review, creating a climate which may have caused the reduction in published studies. A UK-based supporter of the health potential of meditation, Fenwick even questioned the clinical use of meditation in general in the *BMJ* in 1982. Having begun the medicalised meditation movement, the increasingly critical environment led to introspection in TM research. However, MBSR was still virtually unknown in the mid-1980s; its advocates would have likely been influenced by the increasingly critical reception of medicalised meditation research rather than direct attacks on the quality of MBSR experiments. One reaction from MBSR scientists to this uncertainty was to reduce references to Buddhist concepts in scientific papers. However, Kabat-Zinn continued to claim a congruence between belief and science in other media.

It is important to acknowledge that meditation is an extremely complex behaviour. Further, clinical conditions such as chronic pain and psoriasis are challenging to understand and treat in their own right. A degree of clinical creativity and experimental freedom may have been positive characteristics in early forms of medicalised meditation. However, the scientific quality of MBSR research did not consistently improve between 1982 and 1990. Despite lacking testable hypotheses and robust experimental methodologies, preliminary mindfulness findings remained bullish, making concrete claims for the benefits of the practice. Evidencing clinical benefits based largely on unreplicated, self-reported data became embedded in the mindfulness rationale. Criticisms in meditation and pain-regulation research reviews suggest that a tendency to overstate preliminary claims was not limited to mindfulness research.

The move to develop new applications of mindfulness after 1985 rather than improve the scientific understanding of MBSR was a crucial choice in how mindfulness developed. This approach confirmed the pragmatic paradigm of Kabat-Zinn's rationale beyond treating chronic pain. Science was recruited to demonstrate clinical benefits without the support of testable

hypotheses or reliable levels of scientific validation. While this approach made evidencing the claims of mindfulness's benefits problematic, it allowed the method to be exported rapidly to different contexts. It may have also reflected a wider disenchantment with the established medico-scientific methodologies in developing new clinical treatments.

There is a lack of clarity over the status of early MBSR research in the scientific literature; it was described as a 'service', a 'pilot study', and an 'observational study'. MBSR was introduced by scientists as a clinical intervention ahead of peer-reviewed evidence for its therapeutic benefit or a demonstration that it did not cause unwanted adverse effects. Experiments were, therefore, an attempt to illustrate the value of the treatment, not establish what mindfulness was or how it mediated health and wellbeing. Little evidence in the scientific literature explains the rationale for offering MBSR through the SR&RP programme. There is also a lack of discussion in the 1986 MBSR review of those patients who experienced worsening symptoms after receiving the treatment. Although the number suffering from this reversal may have been small, the impact of increased chronic pain could have been profound, and understanding why MBSR did not work for all patients would have helped better understand the mechanisms of mindfulness.

Because of the methodological limitations present in the 1986 four-year review of mindfulness, claims made for its success were probably premature and overstated. In fact, because of administrative problems linked to the recording of the PRI data, the reliability of the findings in MBSR may have declined between 1982 and 1986. Still, the scientists reported the 1986 results in positive terms. However, as mindfulness was part of a distinct 'medicalised' approach, perhaps expectations that the technique would fully adapt to the requirements of the scientific method are unrealistic. On this basis, I contend that mindfulness's early progress cannot only be seen in binary terms of 'reliable' or 'unreliable' science. Mindfulness was originally part of a movement seeking to converge belief and scientific knowledge systems;

therefore, the extent to which it conformed to the experimental norms of the psychological sciences cannot be the only measure of its value and effectiveness. Mindfulness may have been drawing the scientific community's attention to the need for more flexible ways of understanding and treating human health and wellbeing.

The influence of mindfulness based on citations in the academic literature and scientific replication was low in the 1980s. Strategic reviews appear to have exercised a 'gatekeeping' role in deciding what constituted reliable science within scientific communities. Hundreds of meditation studies were published between 1970 and 1990, passing through the peer-review process; however, many of the claims made were later criticised in strategic reviews (a pattern which has endured through to the present). The obvious question is, why and how did preliminary studies with obvious methodological problems continue to be published in peer-reviewed journals? There is no simple answer, and it seems probable that the influence of the Counter-culture had established a widespread belief in the reliability or beneficial effects of Buddhist-inspired practices. It is possible that meditation scientists may have used a presumed spiritual authority of religion to mitigate scientific shortcomings.The ongoing use of MBSR in an outpatient clinic in a prestigious medical facility could have also lent credibility to Kabat-Zinn's work. In every case, the question of the scientific governance of mindfulness, the gatekeeping of science creation and its reliable communication in the late 1980s would benefit from much closer scrutiny.

The enthusiastic claims made in many preliminary mindfulness papers would have inevitably interested researchers looking for solutions to challenging health conditions. There was likely interest in MBSR from scientist-practitioners, such as Kristellar, to support or promote the healing potential of spiritual practice. Kabat-Zinn's pragmatic approach was perfectly suited to proliferation. Lacking a theoretical framework and a scientific description of mindfulness states and traits, MBSR could be relocated to almost any setting where it was

felt that it could be beneficial. Scientists and clinicians only had to consider whether their experiments could demonstrate significant positive effects. However, the enthusiastic claims made for preliminary mindfulness studies in scientific journals may have given rise to misunderstandings and confusion over the actual curative potential of medicalised meditation techniques.

After 1985, scientific accounts of mindfulness became secular, although Kabat-Zinn wrote about the links between MBSR and Buddhism in non-scientific media. This situation illustrates another of the contradictions or dualities present in medicalised mindfulness. Mindfulness was a fluid concept that could be presented as secular or spiritual depending on the audience being addressed and the channel of communication used. Rather than being a limiting factor in the diversification of mindfulness, its ambiguous placement as scientifically validated and Buddhist-inspired and a bridge between the two may have increased its widespread appeal.

More research is needed to fully consider the influence of belief and disbelief on the progression of medicalised meditation. In addition, there are indications of a complex relationship between the medico-scientific status of interventions and the broader commodification of meditation techniques. By publishing self-help books, Kabat-Zinn promoted mindfulness to health-conscious audiences and Western spiritual/Buddhist practitioners without the support of robust, replicated scientific evidence.

By 1986, meditation scientists had abandoned explanations of causality between mindfulness and the self-regulation of pain, appearing to lean on Benson's RR hypothesis. Although Benson's claims were contested in the 1980s, the reconfiguration of mindfulness as a generic relaxation technique opened up many possibilities for its wider use. Kabat-Zinn began to position mindfulness as relaxation therapy, both in its own right and as an adjunct to interventions where increased relaxation might be desirable. The original pragmatic approach

developed for MBSR bled into many other uses of mindfulness, such as the treatment of psoriasis. This generic use of mindfulness does not mean that it did not work or that it was not a useful clinical approach; rather, there was little scientific attention given to how or why it achieved positive results. This uncertainty presented major replication problems, with each application of mindfulness needing to establish its value experimentally.

The psoriasis intervention in 1988 illustrated the flexibility of mindfulness when introduced as one component of a treatment that included UV lights, music, visualisation, and other mental processes. No scientific rationale for including mindfulness (or the music and visualisation) was described other than a general sense that relaxation could positively enhance the treatment of skin conditions and that mindfulness could support relaxation. Kabat-Zinn collaborated with clinicians to present mindfulness as a treatment in an area unrelated to his training and previous clinical experience. This approach indicates an ability to identify emerging opportunities for mindfulness in new fields and find suitable collaborators. The preliminary psoriasis study cited earlier MBSR studies, themselves preliminary, showing that the MBSR paradigm was being built on uncertain scientific foundations. It also appears that despite an awareness of the methodological limitations in the 1986 four-year mindfulness review, Kabat-Zinn and colleagues used it as a demonstration of concept to support the development of new mindfulness interventions. In addition, the psoriasis study contained problems observed in Kabat-Zinn's earlier work: a degree of subjectivity, a lack of reliable controls and a pragmatic approach lacking a stable theoretical framework.

As mindfulness headed towards the 1990s, its advocates attempted to establish it in several new health and wellbeing contexts. It had been secularised in the scientific literature but maintained a religious dimension when described in other media. The lack of reliable scientific validation had not presented a barrier to its proliferation, but methodological and theoretical limitations continued to be observed in its new applications. Kabat-Zinn was aware

of the problems of relying on subjective data to make scientific claims. Still, his mindfulness studies generally steered clear of using objective measurements that could have helped improve its scientific standing. By 1990, mindfulness meditation was building a track record of exciting claims that rarely achieved the level of scientific validation provided by replicated RCTs.

Chapter 5: The Slow Progress Towards MBCT: 1991 to 2000

1. Introduction

In 1991, MBSR was still relatively unknown in the scientific community. However, the expansion of mindfulness research after 1985 led to horizontal growth in published studies. I use the concept of horizontal research to indicate preliminary and pilot investigations across multiple disciplines, with few attempts at robust replication. This is in contrast to a 'vertical' model, where a concept would be proven through reliable scientific validation ahead of proliferation. As highlighted in the Introduction, a more negative reception of belief-based meditation after 1985, described in Chapter 4, likely led to increased uncertainty in the theory and practice of mindfulness. Mindfulness was originally introduced in the peer-reviewed literature as a relocated belief-based practice consistent with scientific understandings. However, the 1986 MBSR four-year review paper presented mindfulness as a pragmatic secular intervention linked to other medico-scientific concepts, particularly the RR.[1] This relationship seems speculative because Benson's theoretical framework was based on the positivist isolation of four components of pan-spiritual practices.[2] In contrast, Kabat-Zinn's version of mindfulness lacked a scientific theoretical framework and claims of its Buddhist origins were only promoted in non-scientific contexts such as the *Full Catastrophe Living* self-help guide.[3]

The lack of a theoretical framework also maintained uncertainty in what mindfulness was and how it might be used. MBSR was a treatment for chronic pain, but as a generic relaxation technique, it could be deployed as an adjunct in treating psoriasis or other health

[1] Kabat-Zinn, 'An Outpatient Program in Behavioural Medicine for Chronic Pain Patients Based on the Practice of Mindfulness Meditation: Theoretical Considerations and Preliminary Results'. p. 34.
[2] Benson, Beary, and Carol, 'The Relaxation Response'.
[3] Kabat-Zinn, *Full Catastrophe Living*.

conditions.[4] From a historical perspective, it seems that during the 1990s, mindfulness research was caught in a challenging situation. Theoretical uncertainty facilitated its proliferation, but the lack of testable hypotheses made reliable scientific validation unlikely. Scientists could show a correlation between practising mindfulness and improved health, but not that the mechanisms of mindfulness were the cause of positive patient outcomes. Scientific interest was mixed during the decade, but there are signs of consistent growth after 1995 (Figure 10), linked to an increased positive reception following the publication of the influential Attentional Control Therapy (ACT) study.[5]

In 1992, Kabat-Zinn and others published the results of experiments evaluating the use of MBSR in treating anxiety: 'Effectiveness of a Meditation-Based Stress Reduction Program in the Treatment of Anxiety Disorders'.[6] This study appeared in *The American Journal of Psychiatry* and was supported by a grant from the UMMS. As discussed in Section 3, the pattern seen in this paper reflected the problems and opportunities that had become the signature of mindfulness research. Despite methodological limitations, including low participant numbers, the claims made in this study were promising: 'A group mindfulness meditation training program can effectively reduce symptoms of anxiety and panic and can help maintain these reductions in patients with generalized anxiety disorder, panic disorder, or panic disorder with agoraphobia.'[7]

[4] Bernhard, Kristeller, and Kabat-Zinn.
[5] John D. Teasdale, Zindel Segal, and J. Mark G. Williams, 'How Does Cognitive Therapy Prevent Depressive Relapse and Why Should Attentional Control (Mindfulness) Training Help?', *Behaviour Research and Therapy*, 33.1 (1995), 25–39 <https://doi.org/10.1016/0005-7967(94)E0011-7>.
[6] Jon Kabat-Zinn, Ann Massion, and others, 'Effectiveness of a Meditation-Based Stress Reduction Program in the Treatment of Anxiety Disorders', *The American Journal of Psychiatry*, 149.7 (1992), 936–43 <https://doi.org/10.1176/ajp.149.7.936>.
[7] Kabat-Zinn, Massion, and others. p. 936.

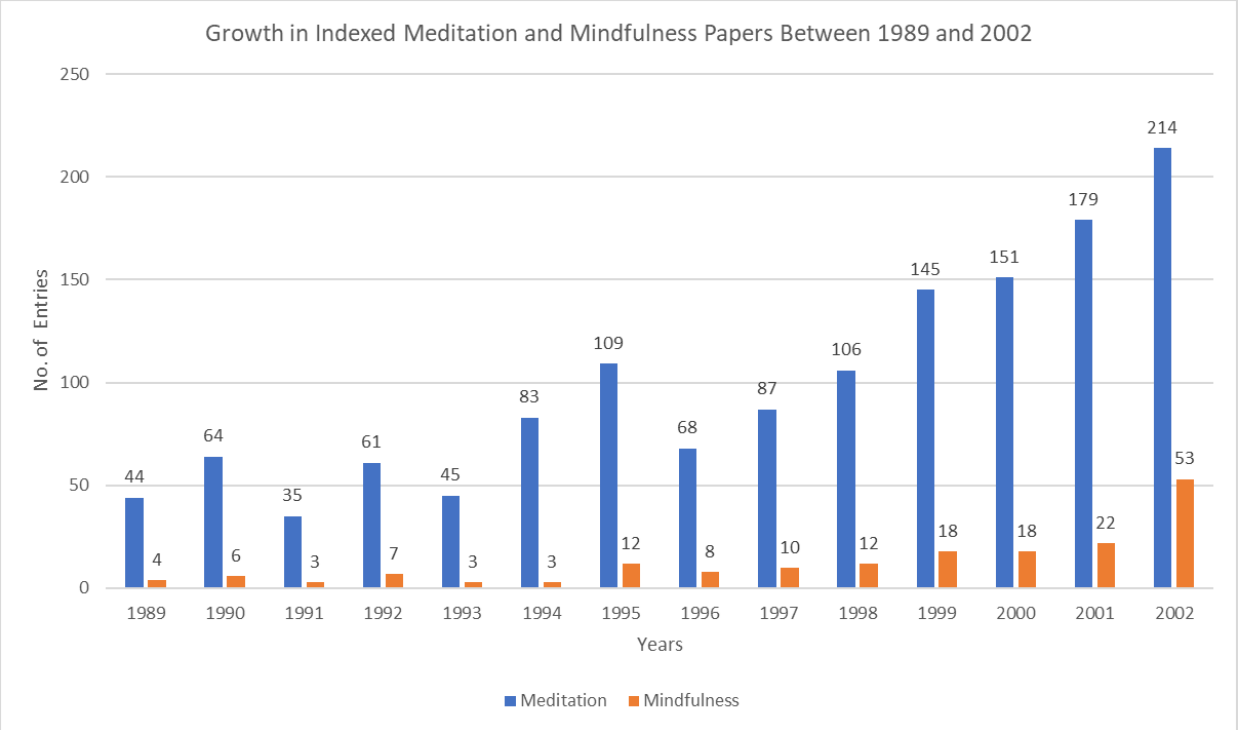

Fig. 10. The comparative number of entries in the Scopus database with the terms 'meditation' and 'mindfulness' in the abstract, title, or keywords indexed between 1989 and 2002.[8]

However, methodological uncertainty led to the paper's claims falling short of scientific validation. This anxiety study was published ten years after the first MBSR paper in 1982. Yet, similar problems, such as a lack of controls, were still limiting the scientific reliability of mindfulness research.

The 1992 MBSR anxiety study demonstrated that mindfulness research might remain at a promising but preliminary stage unless the experiments produced a higher level of scientific validation. It seems likely that the relatively low levels of scientific interest in mindfulness in the 1990s were linked to the preliminary and unreplicated nature of experimental research. Scientific credibility was not just a problem for mindfulness; in the early

[8] Elsevier, Document Search 'meditation' and 'mindfulness', Scopus, 2023 <https://www.scopus.com> [accessed 28 September 2023].

1990s, the reliability of medicalised meditation research in general was also under threat. As discussed in Chapter 4, in 1984, David Holmes challenged the evidence linking meditation to reduced arousal.'[9] That meditation could mediate arousal was central to the claims made for medicalised meditation. Unsurprisingly, meditation scientists, including Benson and Richard Friedman, rejected Holmes's claim.[10] Holmes's challenge is important to this scientific history for several reasons. It influenced meditation research in the early 1990s by confirming the fragility of the science that supported the growth of medicalised meditation. However, Holmes also highlighted a major flaw in the research landscape: the relative nature of many scientific claims. Holmes did not contend that meditation did not lower arousal; rather, it was no more effective at reducing arousal than 'resting' (not doing anything). The recurrent theme still in play in the 1990s decade is that the benefits of meditation were often experimentally established without the use of controls. The effectiveness of interventions such as MBSR was typically claimed without reference to other interventions (controls), so the benefits of mindfulness were often compared to no treatment.

A mindfulness-related study offering improved theoretical and methodological approaches emerged in this decade but from unexpected sources. So influential was this new, more reliable tangent to the existing body of mindfulness research that it became the most significant series of experiments after Kabat-Zinn and other's original MBSR investigations. This new approach was the development of Mindfulness Based Cognitive Therapy (MBCT). MBCT combined mindfulness with Cognitive Behavioural Therapy (CBT) to create an innovative treatment to prevent depressive relapses.[11] CBT is a common form of Cognitive Therapy (CT) developed by Aaron Beck in the late 1960s. Beck established CBT by combining

[9] Holmes.
[10] Herbert Benson and Richard Friedman, 'A Rebuttal to the Conclusions of David S. Holmes's Article. "Meditation and Somatic Arousal Reduction"', *American Psychologist*, 40.6 (1985), 725–28 <https://doi.org/10.1037/0003-066X.40.6.725>. (accessed 6 January 2022).
[11] Aaron T. Beck, 'The Current State of Cognitive Therapy: A 40-Year Retrospective', *Archives of General Psychiatry*, 62.9 (2005), 953–59 <https://doi.org/10.1001/archpsyc.62.9.953>.

concepts from behavioural and cognitive psychology. As a problem-focused or condition-specific treatment, it is most often used to support patients in developing strategies to cope with mental health conditions. The CBT rationale is based on a cognitive model where learned information-processing skills can reduce unwanted symptoms.[12]

The theoretical framework for MBCT was proposed by three mainstream cognitive scientists in 1995: John Teasdale from the Medical Research Council Applied Psychology Unit in the UK, Zindel Segal of the Clark Institute of Psychiatry at the University of Toronto and Mark Williams from the Department of Psychology, University College of North Wales. Their paper, 'How Does Cognitive Therapy Prevent Depressive Relapse and Why Should Attentional Control (mindfulness) Training Help?', was partially funded by a grant from the John and Catherine MacArthur Foundation Mental Health Research Network 1. Teasdale and others proposed using Attentional Control Therapy (ACT), later called MBCT, to treat depressive relapses. As will be discussed in Section 4, this theoretical paper explained how the combination of CBT and mindfulness might work:

> Attentional Control Training seeks to combine the complementary strengths of the two treatment approaches that we have described. ACT combines training in redeployment of attention, using the methods of mindfulness training described by Kabat-Zinn with training in the skills typically taught in cognitive therapy for depression in a programme applicable to depressed patients in remission.[13]

In 2000, a four-year follow-up trial of ACT was described in a paper titled 'Prevention of Relapse/recurrence in Major Depression by Mindfulness-based Cognitive Therapy', published in the *Journal of Consulting and Clinical Psychology*.[14] The research was partly supported by grants from the Wales Office of Research and Development for Health and Social Care and the

[12] Beck.
[13] Teasdale, Segal, and Williams. p. 38.
[14] Teasdale and others.

National Institute of Mental Health. Three more scientists joined Teasdale, Segal and Williams for this experimental paper. Valerie Ridgeway from the Medical Research Council Cognition and Brain Sciences Unit at Cambridge; Judith Soulsby of the Institute for Medical and Social Care Research, University of Wales, Bangor; and Mark Lau from the Department of Psychiatry, University of Toronto. The results of the study were significant, leading the scientists to claim that 'MBCT offers a promising cost-efficient psychological approach to preventing relapse/recurrence in recovered recurrently depressed patients.'[15] Such positive claims have been commonplace in mindfulness research since 1982. MBCT research was different because the experiments reached a new level of methodological and theoretical reliability.

The scientific relationship between Kabat-Zinn's early work and MBCT is unclear, not having been fully described or evaluated in the literature. Still, as will be illustrated in Chapter 6, the presence of MBCT dramatically affected the acceptance of mindfulness meditation within science and, ultimately, wider society. MBCT became the first scientifically validated mindfulness intervention and the standard-bearer for the clinical-experimental reputation of mindfulness. Only four years have passed since the publication of the MBCT trial study and its approval by NICE for use in the NHS.[16]

As discussed in Chapter 4, the proliferation of medicalised mindfulness began in 1985, leading to a mosaic of applications and treatments which shared a similar pragmatic rationale. MBCT was a major shift from the original concept and developed in a more traditional medico-scientific environment. As the body of mindfulness research grew in multiple directions, new ways of categorising its divergent forms were needed. Kabat-Zinn's original version of mindfulness continued to be recognised as MBSR or just mindfulness meditation. But MBCT was a fork in the scientific journey. Based on its divergence from MBSR, its separate trajectory

[15] Teasdale and others. p. 615.
[16] NICE, 'Overview | Depression in Adults: Treatment and Management. p.196.

ultimately led to the creation of the mindfulness-based intervention(s) (MBIs) concept, interventions where mindfulness was combined or adapted beyond the original MBSR rationale. However, the term MBIs would not be used regularly for another decade.

Section 2 below describes the broader forces influencing mindfulness's development in the 1990s. Section 3 analyses the proliferation pattern in mindfulness research in the first half of the decade through a case study of the 1992 anxiety investigation.[17] The ACT concept is investigated in Section 4, and Section 5 analyses the 2000 MBCT trial and its significance for mindfulness meditation.[18] The chapter's conclusions are presented in Section 6.

2. Mindfulness in the 1990s: An Increasingly Secular Landscape

At the start of the 1990s, medicalised mindfulness was still relatively unknown to health scientists and meditation researchers. In addition, Kabat-Zinn's mindfulness approach was one of several active areas of mindfulness research. None of the six studies indexed in the Scopus database from 1990 using mindfulness in the title, abstract or keywords were published by Kabat-Zinn.[19] A brief description of these papers illustrates some of the diverse academic narratives present in 1990. Firstly, in his article 'The Relevance of Meditation to Clinical Practice: An Overview', Michael Delmonte referred to mindfulness as 'somewhat akin to free association.'[20] Delmonte also argued that the clinical benefits of medicalised meditation were limited based on the conflicting goals of therapy and spiritual practice. Leslie Kawamura's 'Principles of Buddhism', published in *Zygon*, a journal dedicated to the intersections of Buddhism and science, explained meditation and mindfulness in traditional Mahayana

[17] J. Kabat-Zinn, Massion, and others.
[18] Teasdale, Zindel Segal, and Williams. and Teasdale and others.
[19] Elsevier, Document Search 'mindfulness', Scopus, 2023. <https://www.scopus.com> [accessed 28 October 2023] [accessed 29 September 2023].
[20] Michael M. Delmonte, 'The Relevance of Meditation to Clinical Practice: An Overview', *Applied Psychology*, 39.3 (1990), 331–54 <https://doi.org/10.1111/j.1464-0597.1990.tb01058.x>.

Buddhist terms, highlighting the problems establishing congruence between Buddhism and positivism: 'The soteriological consideration in Buddhism is to realize that reality created by the mind is like an illusion, a concretization of an interdependently originating process into a substantive reality.'[21] Writing in the *Journal of Humanistic Psychology,* Charles Tart suggested that a weakness in the secular use of mindfulness was a failure to integrate it into everyday life.[22] Ellen Langer continued to explore Western concepts of mindfulness in collaboration with Justin Brown in a paper titled 'Mindfulness and Intelligence: A Comparison'. [23] Michael Elms and Gary Gemmill published 'The Psychodynamics of Mindlessness and Dissent in Small Groups', an investigation of mindfulness from the trajectory established by Langer.[24] And Deborrah Frable, Tamela Blackstone, and Carol Scherbaum considered mindfulness from the perspective of personality theory in a study titled 'Marginal and Mindful: Deviants in Social Interactions.[25]

The absence of published work linked to Kabat-Zinn's paradigm contrasts with the interest in Langarian mindfulness. It likely reflects the scientific status of the two different approaches to mindfulness in 1990. This sample of published work shows a detectable separation of religious and scientific ideas, particularly in Delemont's and Kawamura's papers, where both suggest incongruence between belief and science. In the 1990s, the scientific investigation of MBSR continued a secular and pragmatic trajectory, championing clinical effectiveness, as in the 1992 anxiety study.[26] However, away from the formal scientific

[21] Leslie S. Kawamura, 'Principles of Buddhism', *Zygon*, 25.1 (1990), 59–72 <https://doi.org/10.1111/j.1467-9744.1990.tb00870.x>.
[22] Charles T. Tart, 'Extending Mindfulness to Everyday Life', *Journal of Humanistic Psychology*, 30.1 (1990), 81–106 <https://doi.org/10.1177/0022167890301005>.
[23] Justin Brown and Ellen Langer, 'Mindfulness and Intelligence: A Comparison', *Educational Psychologist*, 25.3–4 (1990), 305–35 <https://doi.org/10.1080/00461520.1990.9653116>.
[24] Michael B. Elmes and Gary Gemmill, 'The Psychodynamics of Mindlessness and Dissent in Small Groups', *Small Group Research*, 21.1 (1990), 28–44 <https://doi.org/10.1177/1046496490211003>.
[25] Deborrah E. Frable, Tamela Blackstone, and Carol Scherbaum, 'Marginal and Mindful: Deviants in Social Interactions', *Journal of Personality and Social Psychology*, 59.1 (1990), 140–49 <https://doi.org/10.1037/0022-3514.59.1.140>.
[26] Kabat-Zinn, Massion, and others.

accounts, Kabat-Zinn continued to claim congruence between MBSR and Buddhist knowledge systems. In an interview from 1991 given to Barbera Graham in *Tricycle*, a popular Buddhist magazine, Kabat-Zinn confirmed this close conceptual relationship:

> We're taking what we ourselves understand to be the principles and the essence of the Buddha's teaching and Buddhist wisdom, and we're translating it in such a way that it becomes a living, vibrant way of being for regular people. As in all the Buddhist traditions, when it comes down to it, you have to walk this path yourself.[27]

The claimed 'translation' of the essence of Buddha's teaching into MBSR raises several questions, some discussed in Chapter 1 of this dissertation. This quotation clarifies that Kabat-Zinn's work was still influenced by 'the Buddha's teaching' at this time. By not explaining this relationship in scientific publications, the role of Buddhist thought in mindfulness experiments is largely obscured and understated. Kabat-Zinn's claims of being a scientist-practitioner suggest he adopted an explicitly positivist approach based on the implicit use of spiritual knowledge. The pragmatic nature of mindfulness research and its fluid theoretical and methodological rationales may be linked to this attempted convergence. The unknown elements in the relationship between belief and science in MBSR were a major factor in the Kabat-Zinn mindfulness paradigm and its future trajectory. I contend that until this issue is resolved, criticising Kabat-Zinn's work on methodological grounds alone may be ignoring wider problems of epistemological and ontological conflict discussed in Chapter 1.

In 1966, the academic Kakichi Kadowaki warned of the challenges Westerners faced in engaging with Buddhist ideas: 'Yet it is still very difficult for the Western mind to understand Buddhist thinking and to enter into the Buddhist mentality.'[28] Kabat-Zinn's attempt to translate,

[27] Barbara Graham, 'In the Dukkha Magnet Zone', *Tricycle: The Buddhist Review* <https://tricycle.org/magazine/dukkha-magnet-zone/> [accessed 30 January 2022].
[28] Kakichi Kadowaki, 'Ways of Knowing: A Buddhist-Thomist Dialogue', *International Philosophical Quarterly*, 6.4 (1966), 574–95 <https://doi.org/10.5840/ipq19666455>. p. 574.

aggregate or convert Eastern knowledge confirms the presence of duality at the intersection of belief and Western science, as highlighted by Thomas and discussed in Chapter 4.[29] Western scientists generally could not accept the successful coexistence of two ontologically distinct knowledge systems. Either identifying the most reliable or combining both to establish a singular truth. That unevidenced claims of congruence between Buddhism and science went unchallenged in an interview in a Buddhist magazine, indicating the power relationship between Buddhism and science in that time and place.

Based on Kabat-Zinn's published work, such as the 1992 anxiety study.[30] Rather than bridging science and Buddhist knowledge, many medicalised mindfulness accounts avoided advancing a scientific explanation that linked the meditation practice to the desired beneficial outcome. For example, in the 1995 preliminary investigation of mindfulness's ability to increase melatonin production, Kabat-Zinn and others hypothesised that: 'Previous studies have shown melatonin production is photosensitive, and we suggest here that it also may be psychosensitive.'[31] The experiment's results suggested meditators experienced increased physiological levels of melatonin but without a clear explanation of the underlying causes. It would appear that drawing Buddhism and science together in mindfulness often led away from the pursuit of causal understandings that were a key objective of both Buddhism and science.

3. Research During the Early 1990s: Continued Pragmatism

The main role of this section is to provide an exemplar of mindfulness research from this decade and, through analysis of this case study, to illustrate progress in the field.

[29] Thomas, 'Beyond Conflict and Complementarity Science and Religion in Contemporary India'.
[30] Kabat-Zinn, Massion, and others.
[31] Ann Massion and others, 'Meditation, Melatonin and Breast/Prostate Cancer: Hypothesis and Preliminary Data', *Medical Hypotheses*, 44.1 (1995), 39–46 <https://doi.org/10.1016/0306-9877(95)90299-6>. p. 39.

Mindfulness was engaged in a successful campaign of proliferation, but there was still a pressing need for robust scientific validation. Mindfulness scientists have published excellent results in early-stage experiments since 1982, simultaneously acknowledging methodological problems.[32] However, the obvious solution to the problem, more reliable experiments, or the development of testable hypotheses rarely appeared in the literature. So, while the claims of potential benefits of mindfulness increased, evidence for those benefits remained elusive.

As outlined in the Introduction, in 1992, Kabat-Zinn and others published details of a pilot study investigating the effects of mindfulness on patient experience of anxiety.[33] The participants for this study were selected from the patients referred to the SR&RP. The research aims were described simply: 'This study was designed to determine the effectiveness of a group stress reduction program based on mindfulness meditation for patients with anxiety disorders.'[34] The experiment followed the established pattern of Kabat-Zinn's mindfulness trials based on the existing work of the SR&RP. Self-reported data was created and then treated statistically, enabling evaluation of the clinical benefits of the new potential treatment. The results were positive: 'Repeated measures analyses of variance documented significant reductions in anxiety and depression scores after treatment for 20 of the subjects - changes that were maintained at follow-up.'[35]

This study illustrates how mindfulness's pragmatic approach, not tied to any theoretical framework, could switch between the treatment of chronic pain to anxiety and, ultimately, any number of health conditions. There was a general sense that meditation/mindfulness brought about improved health, but there was no attempt to develop causal explanations. From the

[32] Kabat-Zinn, Massion, and others. p. 942.
[33] Kabat-Zinn, Massion, and others. p. 936.
[34] Kabat-Zinn, Massion, and others. p. 936.
[35] Kabat-Zinn, Massion, and others. p. 936.

description in the paper, it appears that mindfulness training in the SR&RP was becoming more standardised at this time. The methods section described it in some detail:

> The stress reduction and relaxation program is a highly structured training program in mindfulness meditation and its applications, described in detail elsewhere. It takes the form of an 8-week-long course in which participants attend weekly 2-hour classes and, in addition, a 7.5-hour intensive and mostly silent "meditation retreat" session in the sixth week. During each 8-week cycle, five separate but parallel classes are offered. Each is led by one instructor who stays with that group for the duration of the course. Each class has approximately 30 participants with a wide range of medical and psychological disorders. During classes and for homework, participants practice a range of different formal and informal meditation techniques.[36]

We can see the evolution of the method from the early days of MBSR; for example, the treatment phase is now eight weeks and includes a 'retreat'. However, from an experimental point of view, there are still concerns about this approach. Using homework and 'informal meditation techniques' makes a scientific evaluation of the training problematic. If part of the training is unknown or unobserved, its relationship to the curative potential of mindfulness cannot be evaluated. Perhaps more concerning is the use of the same method for 'a wide range of medical and psychological disorders'. Presenting mindfulness as a panacea, with little replicated evidence to support this claim, reflects the enthusiasm and optimism of mindfulness researchers rather than evidence derived from RCTs.

Just as theoretical frameworks remained fluid in the proliferation of mindfulness, experimental methodologies continued to make scientific validation of its benefits problematic. The study's authors reported the methodological weaknesses typical of early-stage mindfulness experiments: 'A salient limitation of this pilot study is that it did not have a randomly selected comparison group. It also lacked a control for concomitant treatment.'[37] Another problem in

[36] Kabat-Zinn, Massion, and others. p. 938.
[37] Kabat-Zinn, Massion, and others. p. 942.

the experiment's design was the low number of participants (20), some of whom were using medication simultaneously (concomitant) as training in mindfulness.[38]

There was no explanation of how or why mindfulness was therapeutically useful in treating chronic pain and anxiety. As I have already mentioned, in 1995, mindfulness was also piloted as a method to increase melatonin production. But there was no satisfying explanation of how mindfulness worked on a neurological, psychological or physiological level. Mindfulness studies frequently cited relevant literature and made links to credible theoretical frameworks. However, this association with ideas failed to develop a convincing cognitive model of mindful states. Despite the positive claims made in this paper, a lack of reliable scientific evidence was a major limitation in mindfulness research and practice in the early 1990s.

4. Attentional Cognitive Therapy ACT: A New Direction in Mindfulness Research

The most influential meditation paper from 1995 developed a conceptual framework for combining mindfulness with CBT.[39] Although CBT was becoming an effective treatment for depression in the 1990s, many patients remained vulnerable to relapses. Teasdale, Segal and Williams wanted to resolve this problem by developing ACT, which eventually became MBCT. Their theoretical discussion argued that processes of attentional control present in mindfulness meditation could be combined with cognitive therapy to create a new treatment: 'This analysis provides the basis for the development of Attentional Control Training, a new

[38] Kabat-Zinn, Massion, and others. p. 936.
[39] Teasdale, Segal, and Williams. p. 25.

approach to preventing relapse that integrates features of cognitive therapy and mindfulness training and is applicable to recovered depressed patients.'[40]

Attentional control is an overarching concept used in psychology to describe how humans pay attention to specific stimuli.[41] ACT is the use of attentional control for therapeutic ends. The ACT paper translated one aspect of the generalisations Kabat-Zinn and other mindfulness scientists had been using into more precise cognitive terms. The scientists did not try to generate an overarching mindfulness theory; they were interested in the narrow relationship between ACT, CBT and depressive relapses.[42] In setting out a hypothesis linking CBT and mindfulness to models of cognitive processes, Teasdale and others had taken mindfulness into new uncharted territory: they attempted to explain the technique scientifically. The hypothesis presented by Teesdale and others rested on the concept of the Interacting Cognitive Subsystem (ICS) framework: 'ICS is a comprehensive conceptual framework within which accounts of all aspects of information-processing may be developed.'[43] Teasdale was an advocate of the ICS model and, together with Philip Barnard, put forward a theory linking it to the maintenance of depressed states in 1991.[44] According to explanations in the 1995 paper, persistent depressed conditions were generated by cycles of thought processes described as 'depressive interlocks' (Figure 11), habitual depressing thoughts:

> On this view, the 'internal' regeneration of depressed states depends critically on the establishment and maintenance of self-perpetuating 'depressive interlock' configurations. The cognitive loop of the depressive interlock configuration involves

[40] Teasdale, Segal, and Williams. p. 27.
[41] For a more detailed explanation of attentional control, see: Michael W. Eysenck and others, 'Anxiety and Cognitive Performance: Attentional Control Theory', *Emotion (Washington, D.C.)*, 7.2 (2007), 336–53 <https://doi.org/10.1037/1528-3542.7.2.336>.
[42] Teasdale, Segal, and Williams. pp. 27-28.
[43] Teasdale, Segal, and Williams. p.28.
[44] Philip J. Barnard and John D. Teasdale, 'Interacting Cognitive Subsystems: A Systemic Approach to Cognitive-Affective Interaction and Change', *Cognition and Emotion*, 5.1 (1991), 1–39 <https://doi.org/10.1080/02699939108411021>.

repeated cycles in which specific meanings are derived from schematic models, and schematic models are synthesised from patterns of specific meanings.[45]

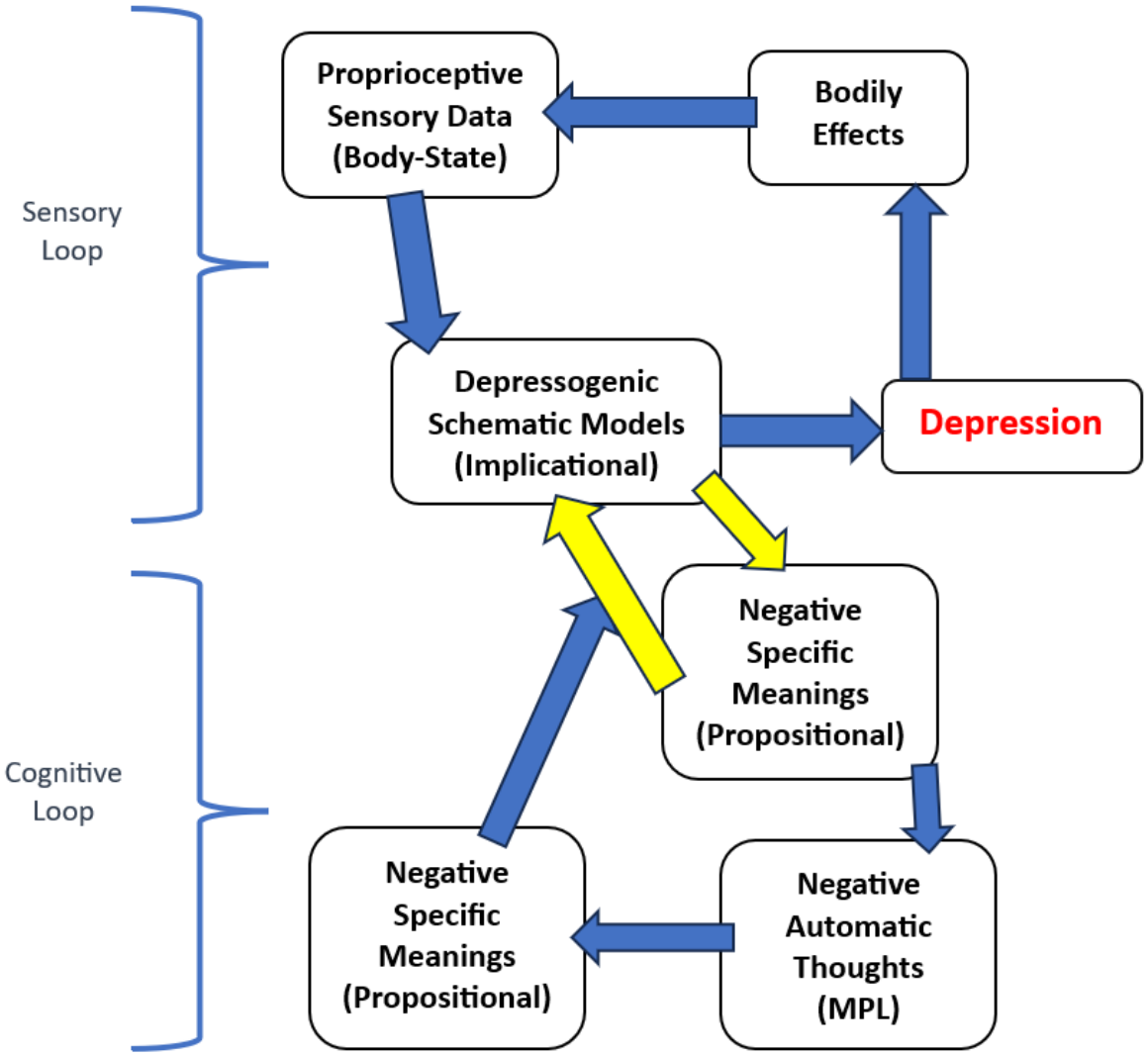

Fig. 11. A representation of the 'Depressive Interlock' described and illustrated in the 1995 paper and captioned thus: 'The 'internal ' maintenance of depression by a self-perpetuating 'Depressive Interlock' processing configuration.' What the paper described as the 'central engine' of cognition (Implicational – Propositional – Implicational loop) is shown as yellow arrows.[46]

Teasdale and others argued that treatment for depressive relapses must divert cognitive resources away from possible depressive interlocks towards more benign thought processes:

[45] Teasdale, Segal, and Williams. p. 30.
[46] Teasdale, Segal, and Williams. p. 29.

‘First, interventions should redeploy the processing resources needed to establish depressive interlock to the processing of non-depressogenic material.’[47] The scientists contended that mindful awareness might be part of a possible solution to relapse into depression. It might help redirect the ‘central engine’ of cognition to attend to neutral concepts in the present moment, such as breathing.[48] Teasdale and others described the curative potential of mindfulness and how it might work in concert with CBT to produce ACT: ‘ACT combines training in the redeployment of attention, using the methods of mindfulness training described by Kabat-Zinn with training in the skills typically taught in cognitive therapy for depression in a programme applicable to depressed patients in remission.’[49] So, in ACT, mindfulness would be used to redirect cognitive processes to neutral concepts; CBT was proposed as a tool to reconfigure some of the original harmful elements:

> In changing depressogenic models into more adaptive, non-depressogenic, models related to the same topics, we have to retain certain core elements of the original, maladaptive patterns at the same time as changing other elements to create a different total pattern.[50]

The paper's discussion of the prophylactic potential of ACT in the context of the ICS framework model is convincing, but the case of combining CBT and mindfulness was less assured. The question of why ‘mindfulness’ was chosen, a therapy that lacked a theoretical framework and a reliable scientific track record, is not fully answered in this paper. Teasdale and others cited the 1988 psoriasis correspondence to illustrate the clinical value of mindfulness, which I described in Chapter 4.[51] The psoriasis correspondence was not a completed peer-reviewed clinical account. In fact, almost all of the mindfulness studies cited

[47] Teasdale, Segal, and Williams. p. 36.
[48] Teasdale, Segal, and Williams. p. 37.
[49] Teasdale, Segal, and Williams. p. 38.
[50] Teasdale, Segal, and Williams. p. 38.
[51] Bernhard, Kristeller, and Kabat-Zinn.

in the 1985 paper were uncontrolled, a point not discussed by Teasdale and others. This uncertainty highlights a second issue: Teasdale and others referred to mindfulness as a treatment for chronic pain, anxiety and psoriasis.[52] But what logical connection was there between these clinical uses and the treatment of depression? Despite the cognitive models used to illustrate the potential benefit of mindfulness in treating depression, the paper also describes mindfulness as a 'generic' stress-reduction tool.[53] In linking mindfulness to its different applications, Teasdale and others positioned mindfulness as both an adjunct for CBT treatment for depression and a general relaxation treatment: 'This evidence is particularly impressive when it is remembered that the skills taught by the programme are generic, there being no specific focus on procedures particularly tailored to any given disorder.'[54] By describing MBSR thus, the role and effectiveness of mindfulness in early studies could be reconsidered, and its relationship with soteriological practice revised.

Mindfulness became integrated within a more established scientific paradigm through its association with ACT, but it was also presented as a condition-specific tool in ACT, a generic relaxation therapy and a possible panacea. In addition to those attributes, Combining mindfulness with CBT was described as more cost-effective than CBT alone. Of CBT, the scientists claimed:

> However, it is demanding of skilled therapist time and not readily applicable in the remitted, euthymic, state. Mindfulness training is applicable and acceptable in the euthymic state, is used by clients on a continuing basis long after the initial training has been completed, is economical of therapist time, and teaches generic psychological skills.[55]

[52] Teasdale, Segal, and Williams. p.33.
[53] Teasdale, Segal, and Williams. p. 33.
[54] Teasdale, Segal, and Williams. p. 33.
[55] Teasdale, Segal, and Williams. p. 38.

The reference to the euthymic state (relaxed state) further confirms the status of mindfulness as relaxation therapy. We see here that the rationale for ACT was based, in part, on unreplicated claims made in earlier mindfulness studies about the widespread benefits seen in several preliminary studies.

In 1999, Teasdale published a paper which described MBCT in increasingly positive terms: 'Mindfulness training teaches skills to enter this mode, and forms a central component of Mindfulness-based Cognitive Therapy, a novel, cost-efficient group preventative programme, for which there is encouraging evidence of effectiveness.'[56] In this account, the basic premise for using mindfulness was unchanged, limiting the impact or creation of the depressive interlock. But the explanation of how MBCT was presumed to work had become more elegant:

> This analysis suggests, as an alternative to cognitive therapy with its focus on changing the content of depression-related thought, the strategy of changing the configuration, or mode, within which depression-related thoughts and feelings are processed, i.e. changing one's relationship to inner experience.[57]

Given the lack of mainstream support for MBSR up to this point, the interest of these scientists from different institutions must have seemed like an important landmark for Kabat-Zinn and the MBSR community. Although there is no explicit mention of collaboration in this paper, the 2000 follow-up study does acknowledge the support of Kabat-Zinn and other colleagues.[58] Although these scientists had no apparent connections with mindfulness research until 1995, they all had or developed an interest in spiritual practices. Teasdale was connected to the

[56] John D. Teasdale, 'Metacognition, Mindfulness and the Modification of Mood Disorders', *Clinical Psychology & Psychotherapy*, 6.2 (1999), 146–55 <https://doi.org/10.1002/(SICI)1099-0879(199905)6:2<146::AID-CPP195>3.0.CO;2-E>. p. 145.
[57] Teasdale. p. 145.
[58] Teasdale and others. p. 615.

Buddhist Insight Meditation Society from at least 1993.[59] Later, he collaborated with a Buddhist, Kulananda, to explain cognitive concepts in Buddhist theoretical models of suffering.[60] In 2011, Segal and Melanie Fennell suggested that MBCT could be a creative fusion of Buddhist thought and cognitive science: 'Despite authentic differences that deserve to be respected, it would seem that these unlikely partners have enough in common for a productive and peaceful union to evolve and endure.'[61] Mark Williams has a long-standing relationship with the Church of England and is currently an ordained priest in that tradition.[62] In these studies, both Teasdale and Segal appear to follow the dualistic tendency of attempting to combine or aggregate Eastern spiritual knowledge with science, which is not unlike the work of Wallace, Benson, and Kabat-Zinn. In a context where mindfulness was claimed to be a bridge between belief and science, the spiritual convictions of these scientists may have also been a factor in their research. This issue presents another reason for increased attention to the role of belief/disbelief in science creation.

5. MBCT: Proof of the Mindfulness Concept?

Between 1995 and 2005, several studies were published illustrating the benefits of MBCT. Still, the most influential and widely cited was an account from 2000, 'Prevention of Relapse/Recurrence in Major Depression by Mindfulness-Based Cognitive Therapy',

[59] 'John Teasdale', *Insight Meditation Society* <https://www.dharma.org/teacher/john-teasdale/> [accessed 23 January 2022].
[60] John D. Teasdale and Michael Chaskalson (Kulananda), 'How Does Mindfulness Transform Suffering? II: The Transformation of Dukkha', *Contemporary Buddhism*, 12.1 (2011), 103–24 <https://doi.org/10.1080/14639947.2011.564826>.
[61] Melanie Fennell and Zindel Segal, 'Mindfulness-Based Cognitive Therapy: Culture Clash or Creative Fusion?', *Contemporary Buddhism*, 12.1 (2011), 125–42 <https://doi.org/10.1080/14639947.2011.564828>. p. 140.
[62] The Church of England, 'National Register of Clergy' <https://www.churchofengland.org/about/national-register-clergy> [accessed 23 January 2022].

published in the *Journal of Consulting and Clinical Psychology.*[63] This investigation used the 1995 ACT theoretical framework as a rationale for a major clinical trial.[64] In this project, Teasdale, Segal, and Williams were joined by Ridgeway Soulsby and Lau. The research was part-funded by a grant from the Wales Office of Research and Development for Health and Social Care and the National Institute of Mental Health.

The main research goal was to establish if MBCT, offered as group therapy, would lead to a reduction in relapses into clinical depression among 'Recovered recurrently depressed patients'.[65] The first section of this paper describes the development and use of MBCT while stressing the growing evidence of viable alternatives to drug-related treatments for depression. In 1998, Giovanni Fava and others ran a trial indicating that following treatment with antidepressant medication, CBT, had been demonstrated to reduce the rate of further relapses.[66] Fava and others concluded that:

> These results challenge the assumption that long-term drug treatment is the only tool to prevent relapse in patients with recurrent depression. Although maintenance pharmacotherapy seems to be necessary in some patients, CBT offers a viable alternative for other patients.[67]

Here, MBCT was being positioned as part of a wider movement seeking alternatives to pharmacological treatments for depressive relapses. But rather than reject the use of medication, the 2000 MBCT study created a mixed treatment regime with a combination of drugs, CBT, and mindfulness:

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[63] Teasdale and others.
[64] Teasdale, Segal, and Williams.
[65] Teasdale and others. p. 615.
[66] Giovanni A. Fava and others, 'Prevention of Recurrent Depression With Cognitive Behavioral Therapy: Preliminary Findings', *Archives of General Psychiatry*, 55.9 (1998), 816–20 <https://doi.org/10.1001/archpsyc.55.9.816>.
[67] Fava and others. p. 816.

> To examine whether the reduction in relapse and recurrence in patients with three or more episodes receiving MBCT was secondary to increased use of medications for depression, we compared the proportions of patients in the two treatment groups using such medications at any time over the follow-up period.[68]

The Method section of the 2000 study described the experiments as a randomised clinical trial conducted over three sites (Bangor, Cambridge, and Toronto). The experiments were held over 60 weeks, where 145 recurrently depressed patients were randomly assigned to the MBCT or Treatment as Usual (TAU) groups. Patients allocated to the TAU group would, if necessary, continue to receive support for depression as they had done previously. The MBSR group had the same conditions as the TAU group but with the addition of MBCT training 'delivered by an instructor in eight weekly 2-hr group training sessions involving up to 12 recovered recurrently depressed patients.'[69] MBCT is described as integrating elements from Beck's CBT for depression and the MBSR program. Results were obtained from the 69 patients from the TAU group and the 63 patients who had completed a minimum of four MBCT sessions.

The use of medication in both groups added complexity to a clear understanding of the effectiveness of MBCT. About 40 per cent of patients from both groups made use of medication during the trial, but it was argued that this probably had no bearing on the significance of the results, although different interpretations are possible: 'Alternatively, it is conceivable that MBCT may have made patients more responsive to the effects of other treatments.'[70] In addition, the mindfulness element of MBCT was not controlled for. The extra mindfulness training was not balanced with an equivalent intervention in the control group, so the potential influence of placebo or clinical empathy could influence patients' progress. Overall, the study demonstrated evidence supporting the use of MBCT in certain conditions: 'In summary, the

[68] Teasdale and others. p. 621.
[69] Teasdale and others. p. 618.
[70] Teasdale and others. p. 621.

main finding was that, in participants with three or more previous episodes of depression (who composed 77 per cent of the sample), an "adequate dose" of MBCT almost halved relapse/recurrence rates over the follow-up period compared with TAU.'[71] That MBCT was shown to be successful in patients who had experienced three or more depressive relapses but brought no benefit to patients who had suffered two is problematic, although it was considered in the paper's Discussion:

> The above account suggests the possibility that, in the present study, (a) the greater risk of relapse/recurrence in those with three or more episodes than in those with only two episodes (apparent in the TAU group) was to a large extent attributable to autonomous relapse/recurrence processes involving reactivation of depressogenic thinking patterns by dysphoria and (b) the prophylactic effects of MBCT arose, specifically, from disruption of those processes at times of potential relapse/recurrence.[72]

Although I have highlighted methodological limitations, this study greatly improved from previous mindfulness investigations. The concluding remarks from this paper claimed the study to be the most rigorous evaluation of medicalised mindfulness to date; and earlier studies were described as 'smaller or less controlled'.[73] This uncontroversial statement illustrates the poor standing of early mindfulness research, even among 'mindfulness-friendly' scientists. Although Teasdale and others were careful to link their clinical evidence to the wider mindfulness movement, they indicated a new way of using and evaluating the technique, an approach more consistent with traditional scientific values. The contrast with earlier mindfulness studies is also apparent in the findings. Claims of clinical effectiveness based on preliminary evidence were common in early mindfulness research. Conversely, this study adopted a far more robust methodology and yet was careful not to overstate its success: 'the

[71] Teasdale and others. p. 621.
[72] Teasdale and others. p. 622.
[73] Teasdale and others. p. 622.

present findings suggest that mindfulness-based clinical interventions may hold considerable therapeutic promise, either alone or in combination with other forms of intervention.'[74] This statement supports the characterisation of mindfulness as a promising but unproven therapy.

The limitations identified in earlier mindfulness studies do not mean that the preliminary work was without merit, but it was categorised as less scientifically reliable. It is important to reiterate that mindfulness was adopted for ACT on the basis of those earlier less well-controlled studies.[75] Also, MBCT was developed without any experimental evidence supporting the role of mindfulness in preventing depressive relapse. Despite the success of the clinical trial, there is a gap in the knowledge here: a testable model that would illustrate the relationship between the training method (attentional control) and improved clinical outcomes. Acknowledgement of support by Teasdale and others from Kabat-Zinn and colleagues probably indicates acceptance by Kabat-Zinn of the use of mindfulness of MBCT:

> We are most grateful to Jon Kabat-Zinn, Saki Santorelli, Ferris Urbanowski, Elana Rosenbaum, and the staff of the Center for Mindfulness in Medicine, Health Care and Society, University of Massachusetts Medical Center, for invaluable guidance and support in treatment development.[76]

Having originally identified the lack of controls as a major weakness in his 1982 mindfulness study, the development of MBCT began the transition to a robust scientific validation of the mindfulness concept.

[74] Teasdale and others. p. 623.
[75] Teasdale, Segal, and Williams.
[76] Teasdale and others. p. 615.

6. Conclusions

There are relatively few visible external (socio-cultural) forces influencing the progress of mindfulness in the 1990s. The pushback against the presence of belief-based knowledge in scientific settings is still detectable. Meditation experiments generally suffered from the declining status and interest in TM research. Scientific meditation studies were receiving more critical attention, and their value to medicine was even questioned. While this shift seems to have increased interest in Langarian mindfulness, the reception of Kabat-Zinn's work was modest. From a historical perspective, it seems possible that without some improvement in the scientific interest in mindfulness, MBSR might have experienced further decline. The unexpected arrival of MBCT in 2000 dramatically boosted mindfulness's fortunes but highlighted limitations in the research conducted since 1982.

There are elements in this thesis which are repetitive, even from the author's perspective. From Chapter 2 onwards, the criticisms of theoretical and methodological problems in medicalised meditation research are commonplace. However, this is an inescapable theme of this history, that poor quality research became part of the mindfulness paradigm despite being rebuked by critical reviews. In this decade, the anxiety paper published in 1992 and the melatonin study published in 1995 contained similar limitations to Kabat-Zinn's 1982 MBSR investigation. However, MBCT research offered a new trajectory for mindfulness researchers.

The publication of the MBCT RCT in 2000 offers an important context from which to view earlier mindfulness studies. Firstly, it confirms that well-conducted scientific studies were possible and that placing mindfulness in a stable theoretical framework such as MBCT was achievable. One way of thinking about the often criticised preliminary medicalised mindfulness research is that Kabat-Zinn chose not to conform to the positivist methods normally applied

when developing medical interventions. His approach may have been a strategic choice in creating the mindfulness concept as a panacea or a generic relaxation therapy outside of or beyond the reach of strict positivist enquiry. It is also possible that methodological compromises were made due to narrowing the boundaries between belief and science in MBSR and the ontological cost of claiming MBSR as both scientific and Buddhist. Kabat-Zinn's continued presentation of MBSR as a fusion of the spiritual and scientific highlights a dualism in the engagement of Western scientists with belief-based knowledge. This suggests an inability to see religion and science as separate but meaningful knowledge systems in their own right. Criticising the work of Kabat-Zinn and others on methodological grounds alone may ignore wider problems of epistemological and ontological conflict, possibly obscured from scientists due to incommensurability or other conceptual limitations.[77]

The proliferation pattern of mindfulness up to 1995 indicates a willingness to maintain mindfulness as a conceptually fluid, pragmatic health intervention. A lack of a scientific definition for mindfulness may have been key to its adoption as an ACT component, presenting a blank conceptual canvas to Teasdale and others. In fact, Kabat-Zinn's resistance to establishing a theoretical model would enable mindfulness to be reinvented in almost any context where its curative potential was tested. Creating a scientific rationale for ACT enabled the integration of mindfulness as an adjunct to condition-specific CBT therapy; it was 'bolted on' to the main CBT element of the treatment. The potential of mindfulness as both treatment-specific and a generic relaxation therapy raises other questions. For example, where was the replicated evidence of the relaxation potential of MBSR and was it more effective than any other relaxation therapy?

The ACT hypothesis rests on several assumptions about what mindfulness meditation might be and the mental states it creates without any real empirical evidence from mindfulness

[77] For a fuller discussion of ontological conflict see Chapter 1.

experiments. However, ACT should be seen as an early stage in improving the scientific understanding of mindfulness; it was not an attempt at an overarching explanation. From a science creation perspective, Kabat-Zinn's mindfulness paradigm was strengthened by its association with ACT and MBCT. After repeated calls for improved scientific investigations, here was a good example of scientists demonstrating actual curative potential rather than promise. Given Kabat-Zinn's claims that mindfulness was a bridge between belief (Buddhism) and science, the spiritual convictions of the architects of MBCT may be an issue requiring further consideration.

Support from Kabat-Zinn and others at the SR&RP, acknowledged in the MBCT paper, suggests the interest of mainstream cognitive scientists was welcomed. Kabat-Zinn appears to have lacked psychological and clinical training; through Teasdale and others, mindfulness received a fresh, cognitively grounded approach. The four-year follow-up MBCT trial from 2000 addressed many methodological problems that limited Kabat-Zinn's early work, and the results were just as impressive. The study found that MBCT halved rates of depressive relapse when compared with TAU, but surprisingly, only for patients who had experienced three or more relapses. MBCT can be considered a major departure from the earlier mindfulness studies. The theoretical and experimental contexts were entirely different. There were some problems with the MBCT trial, such as concomitant treatment, subjective measures, and unsupervised training (homework). But overall, MBCT dramatically improved the scientific validation of a mindfulness intervention, a point made by Teasdale and colleagues in their paper. However, by describing their trial as the first multi-centred randomised control study, they put a degree of scientific distance between their work and the body of mindfulness research and practice.

The thinly veiled criticisms by Teasdale and others towards the first two decades of medicalised mindfulness research suggest that the division between medicalised and traditional

meditation research was alive and well. In many respects, although MBSR and MBCT shared the term mindfulness, they were not part of the same project. The transition of MBSR to MBCT was unusual. MBSR began its medico-scientific journey as a treatment in an outpatient clinic; then, clinical studies attempted to demonstrate its effectiveness, and finally, a cognitive model (from the ICS framework) explained an element of its curative potential. Of course, it was the opposite with MBCT, where the model preceded the successful clinical trial on which treatment delivery depended. More research is needed to consider the roles of scientific governance and peer-reviewed publications in these circumstances. Ironically, MBCT boosted the reputation of mindfulness research while illustrating the weaknesses in the medicalised mindfulness approach. In 2000, mindfulness research was at something of a crossroads. Would scientists follow the popular pragmatic medicalised approach, which often produced impressive preliminary results or move towards reliable scientific validation using the methodology illustrated by MBCT research?

Chapter 6: Promising but not Proven: The Dramatic Growth in Mindfulness: 2001 to 2010

1. Introduction

There is a clear transition between the last and present chapters. Mindfulness research grew slowly but consistently throughout the 1990s. However, the positive critical acceptance of the first MBCT trial in 2000, reviewed in the previous chapter, radically altered the mindfulness landscape.[1] The MBCT study delivered the impressive results typical of preliminary mindfulness experiments while using the most methodologically robust approach seen in mindfulness studies up to that point.[2] Having largely ignored the experimental progress of mindfulness in the 1980s and 1990s, it did not take scientific communities long to wake up to its clinical potential following the MBCT trial. In the Conclusions of the 2000 study discussed in the last chapter, Teasdale and others highlighted limitations in establishing causality in the experiment, specifically the failure to use a matched control; thus, MBCT was not a full scientific validation. However, after the declining status of meditation research since 1980, here was a high-profile, scientifically robust meditation study the contemplative science community could rally behind. As described in Section 2, the reception of MBCT was a major factor supporting the growth in mindfulness research in this decade. However, there were other reasons scientists would have chosen to create new MBIs at this time, particularly when institutions started to put their weight behind the project.

[1] Teasdale and others.
[2] In the conclusions of the 2000 MBCT study, the experiments were described as the first mindfulness studies that used a robust RCT type methodology. See Teasdale and others. p. 622.

As outlined in the Introduction, this thesis considers the progress of mindfulness as an international project up to the year 2000, although most early influential studies were published in the USA. However, as described in Chapter 5, MBCT was developed by scientists working at two British and one Canadian institutions; this gave the UK significant momentum in this field.[3] While scientific studies will continue to be reviewed based on their merits, the focus on the reception and implementation of mindfulness in this and the following chapter reflects the growing importance of UK actors and institutions in the scientific progress of MBSR and MBIs. One of the founders of MBCT, Mark Williams, helped establish the Centre for Mindfulness Research and Practice at Bangor University in Wales in 2001.[4] As previously discussed, NICE recommended MBCT for use in the UK's National Health Service (NHS) in 2004.[5] The early acceptance of mindfulness in the UK is of particular interest to my research, which was funded and carried out in the UK. As the decade progressed, mindfulness studies appeared in many different disciplines, although the main focus of the thesis remains the role of mindfulness in health and wellbeing.

The increased profile of mindfulness led to rapid growth in published studies. For 2001, 22 mindfulness publications are indexed in the Scopus academic database; that total rose almost 20-fold to 412 publications by 2010. The annual totals of articles containing the search term 'mindfulness' in the abstract, title, or keywords are illustrated below (Figure 12). Establishing the proportion of the 1,635 scientific studies indexed between 2001 and 2010 is problematic. A crude estimate based on a search of the indexed entries filtered by discipline (subject area) indicates that approximately 75 per cent of 'mindfulness' papers were published in medicine, neuroscience, psychology and other scientific fields. However, not all of these studies were experimental.

[3] Teasdale and others.
[4] Bangor University, 'Welcome to the Centre for Mindfulness Research and Practice', *Bangor University*, 2023 <https://www.bangor.ac.uk/mindfulness/> [accessed 27 August 2022].
[5] Crane and Kuyken.

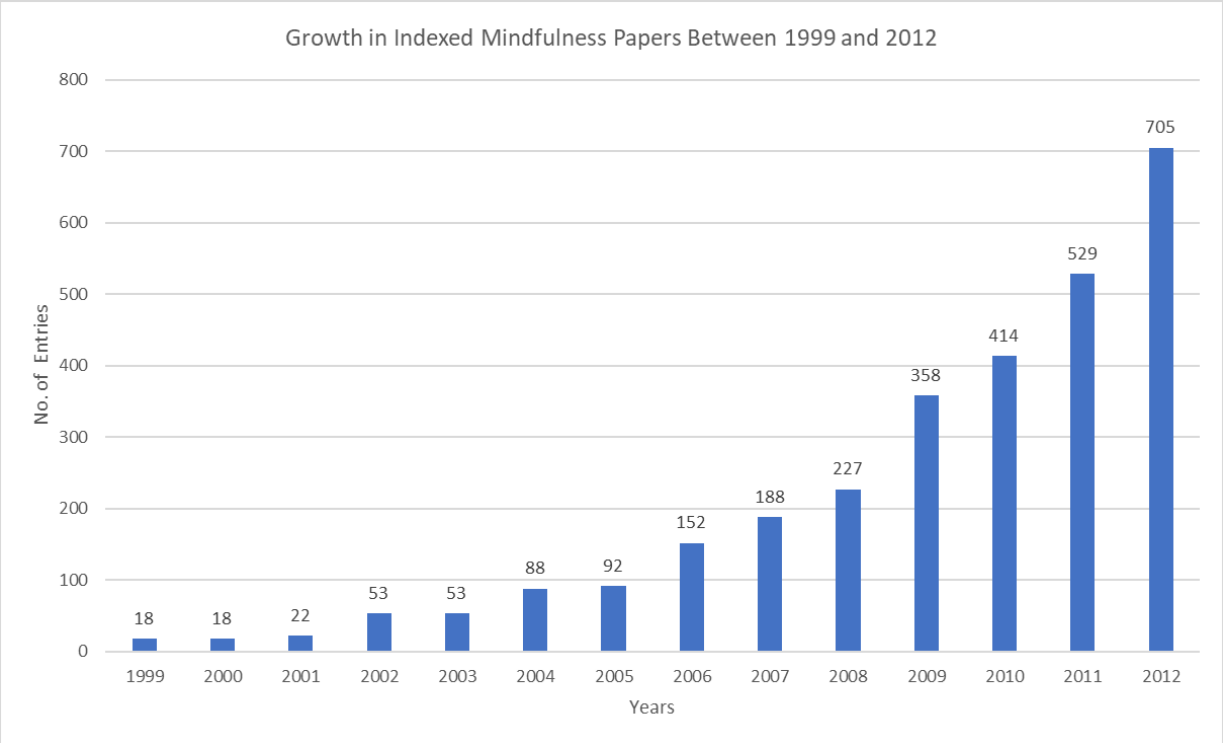

Fig. 12. The total number of entries in the Scopus database with the term 'mindfulness' in the abstract, title, or keywords indexed between 1999 and 2012.[6]

During this decade, one of the main characteristics of mindfulness research was the growing number of variants based on MBSR and other mindfulness approaches, MBIs. For example, in Section 2, a paper by Linda Carlson and others, published in 2001, tested the value of mindfulness among cancer outpatients. This trial was largely unrelated to previous applications such as MBSR or MBCT and indicated the flexibility with which mindfulness was being deployed. Their study 'The Effects of a Mindfulness Meditation-Based Stress Reduction Program on Mood and Symptoms of Stress in Cancer Outpatients: 6-Month Follow-Up' was supported by grants from the Alternative Cancer Research Foundation of Calgary in Canada, took mindfulness to new populations and modified the original MBSR training.[7] This form of

[6] Elsevier, Elsevier, Document Search 'mindfulness', Scopus, 2023 <https://www.scopus.com> [accessed 28 October 2023].
[7] Linda E. Carlson and others, 'The Effects of a Mindfulness Meditation-Based Stress Reduction Program on Mood and Symptoms of Stress in Cancer Outpatients: 6-Month Follow-Up', *Supportive Care in Cancer*, 9.2 (2001), 112–23 <https://doi.org/10.1007/s005200000206>.

proliferation illustrates the concept's enduring flexibility and scientists' confidence in its clinical potential.

Despite the growing application diversity, there were few major conceptual breakthroughs in mindfulness research and practice during the decade. Self-reported questionnaires following the approach adopted in the original MBSR experiments dominated scientific studies. EEG investigations continued contributing objective data to the scientific discussion of mindfulness, but largely as a continuation of the trajectory begun by Walter.[8] Studies such as the experiments by Jim Lagopoulos and others in 2009, 'Increased Theta and Alpha EEG Activity During Nondirective Meditation', demonstrated that different forms of meditation delivered EEG signatures similar to mindfulness: 'These findings from this study suggest that nondirective meditation techniques alter theta and alpha EEG patterns significantly more than regular relaxation, in a manner that is perhaps similar to methods based on mindfulness or concentration.'[9] A minority of experiments continued the tried and tested methodology of using physiological data to establish if mindfulness was effective in increasing relaxation.[10] Many of the neurophysiological studies published during the decade were not replicated and failed to capture the imagination of the wider mindfulness community. After 2010, following the rising use of brain imaging technologies and neuroscience-based experiments, increased technological engagement began to deliver new scientific insights linked to brain functions and structures. These approaches will be reviewed in the following chapter.

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[8] Walter. p. 373.

[9] Jim Lagopoulos and others, 'Increased Theta and Alpha EEG Activity During Nondirective Meditation', *The Journal of Alternative and Complementary Medicine*, 15.11 (2009), 1187–92 <https://doi.org/10.1089/acm.2009.0113>.

[10] Vernon A. Barnes and others, 'Impact of Meditation on Resting and Ambulatory Blood Pressure and Heart Rate in Youth', *Psychosomatic Medicine*, 66.6 (2004), 909 <https://doi.org/10.1097/01.psy.0000145902.91749.35>.

Despite the more robust scientific approach used in MBCT, enthusiasm for preliminary mindfulness experiments with methodological limitations did not weaken. It is important to stress that mindfulness research was not a simple dichotomy. A wide range of methodological approaches was used, although few mindfulness studies reached the standard set in the MBCT trial. As discussed in the following sections, the sheer number of preliminary experiments during this decade challenges the notion of 'good' or 'bad' science. Each investigation had its particular rationale and relationship with the scientific method. Many studies fell short of scientific validation. However, the widespread use of the pragmatic preliminary paradigm linked to MBSR may suggest new ways of investigating mental health or even that a decline in the acceptance of RCT models of scientific evaluation was in progress.

From 2002, strategic reviews and meta-studies regularly highlighted systemic limitations in mindfulness research; even MBCT was not safe from the critical gaze of reviewers.[11] However, the tone of criticism, particularly during the first half of the decade, presented an upbeat interpretation of longstanding methodological problems. The psychologist and meditation researcher Baer published a meta-study of mindfulness research in 2003 from a clinical perspective, one of this decade's most widely cited mindfulness studies.[12] Baer argues that the health benefits linked to mindfulness experiments were promising but not proven. She wrote: 'In spite of significant methodological flaws, the current literature suggests that mindfulness-based interventions may help to alleviate a variety of mental health problems and improve psychological functioning.'[13] Baer was positive about the future of mindfulness research, arguing that improved experiments would likely increase scientific validation. As scientific engagement grew, the enthusiasm of scientists for the mindfulness concept bled into

[11] Baer describes MBCT as the best-researched mindfulness intervention, which still had not reached the 'probably efficacious' designation at that time. See Baer. p. 140.
[12] Baer.
[13] Baer. p. 139.

other areas of daily life and eventually led to a proclamation of a 'Mindfulness Revolution' in 2011.[14]

The movement towards a cognitive explanation for the role of mindfulness in MBCT appeared to have a relatively modest impact on mindfulness research and practice.[15] However, if other MBIs were to be taken seriously by the wider scientific community, a credible theoretical framework would eventually have to demonstrate what mindfulness was and how it worked. If there was no evidence of a causal relationship between mindfulness training and the health benefits reported in experiments, then there would always be doubts about what caused clinical improvements. Sona Dimidjian and Marsha Linehan were two psychologists concerned about how the lack of a theoretical framework of mindfulness might hamper its scientific validation. Their paper, published in the *Clinical Psychology: Science and Practice* journal in 2003, argued that techniques able to establish when participants were in a mindful state were essential to evidencing the effects of MBIs, but they lamented the lack of psychological instruments able to help: 'Unfortunately, such investigations would require a psychometrically sound measure of mindfulness, which the field currently lacks.'[16]

As scientific interest in mindfulness grew, the need to establish a theoretical framework explaining how the training mediated health and wellbeing became more pressing. There had been a reduction in references to the synergy between Buddhism and MBSR in Kabat-Zinn's scientific works after 1985. This pattern changed again when Kabat-Zinn wrote about the relationship between Buddhism and science in a 2003 mindfulness research and practice review.[17] Kabat-Zinn's claims inspired scientists and psychologists to reverse engineer a

[14] Boyce.
[15] Teasdale and others.
[16] Sona Dimidjian and Marsha M. Linehan, 'Defining an Agenda for Future Research on the Clinical Application of Mindfulness Practice', *Clinical Psychology: Science and Practice*, 10.2 (2003), 166–71 <https://doi.org/10.1093/clipsy.bpg019>. p. 169.
[17] Jon Kabat-Zinn, 'Mindfulness-Based Interventions in Context: Past, Present, and Future', *Clinical Psychology: Science and Practice*, 10.2 (2003), 144–56 <https://doi.org/10.1093/clipsy.bpg016>.

theoretical framework for mindfulness. In 2006, Shauna Shapiro and others attempted to advance scientific understanding. 'Mechanisms of Mindfulness' was published in the Journal of Clinical Psychology and supported by a grant from the Fetzer Institute, The Center for Contemplative Mind and Society, and The American Council of Learned Societies. The researchers identified conceptual problems in the original relocation of Buddhist mindfulness, further complicating the scientific understanding of the concept.[18] As preliminary mindfulness research grew, so did the number of applications and variations to the original MBSR training; this fragmentation of the concept led to more confusion. In their 2009 survey of the field supported by a grant from the Michael Tennenbaum Family Fund, 'Classical Mindfulness', Lobsang Rapgay and Alexander Bystrisky from UCLA argued that preliminary mindfulness research was raising new challenging questions:

> These range from the absence of an operational definition of mindfulness as well as little evidence for the mechanisms of mindfulness that account for outcome changes for various psychopathology and medical conditions. Questions about the defining characteristics of mindfulness are also being raised such as the lack of differentiation between the features called attention and awareness and the interchangeable use of the two terms in modern descriptions of mindfulness.[19]

This chapter describes the growth in mindfulness and scientific progress seen through influential scientific papers and engagement with health policy. The case study methodology continues to be important in my analysis here. However, the growing number of published experiments requires more attention to meta-studies and reviews to retain an overview of the field. I have largely drawn upon studies that are among the most cited for the decade; thus, by definition, they were influential. Kabat-Zinn had been the central figure in mindfulness

[18] Shapiro and others.
[19] Lobsang Rapgay and Alexander Bystrisky, 'Classical Mindfulness', *Annals of the New York Academy of Sciences*, 1172.1 (2009), 148–62 <https://doi.org/10.1111/j.1749-6632.2009.04405.x>.

research and practice up to this point. However, as the research volume increased, his direct influence over the scientific trajectory of mindfulness declined somewhat.

Section 2 below analyses the problems and opportunities of the rapid proliferation of mindfulness. A review of a study by Linda Carlson and others into the role of mindfulness in mediating mood and stress in cancer patients provides a clear example.[20] Sections 3 and 4 explore Baer's meta-review of mindfulness from theoretical and empirical perspectives to describe the state of mindfulness research in 2003 and its presumed trajectory.[21] The changing fortunes of MBCT in this decade are reviewed in Section 5. The ongoing challenge of establishing a theoretical framework for mindfulness is illustrated through a case study of the 2006 paper by Shapiro and others in Section 6. I analyse the characterisation of mindfulness research as promising but not proven in Section 7. The chapter's conclusions are presented in Section 8.

2. The Foundations of the Mindfulness Revolution: Opportunities and Challenges in Research and Practice

Interrogating scholarly databases to establish quantitative data on the total number of published mindfulness studies only provides a general guide to scientific trends. The publications identified in Figure 12 above require a more detailed analysis to explain the trajectory of mindfulness at the start of the decade. The 22 articles indexed in 2001 demonstrate the state of mindfulness research and the focus on the breadth of mindfulness's potential rather than the robust replication of existing tentative findings. The main emphasis was still the application of mindfulness and preliminary demonstrations of how it improved health and

[20] Carlson and others.
[21] Baer.

wellbeing, such as the experiments by Diane Reibel and others described in a paper titled 'Mindfulness-Based Stress Reduction and Health-Related Quality of Life in a Heterogeneous Patient Population' published in 2001. Reibel and others looked at the potential of MBSR as a low-cost generic health intervention. Using a pragmatic approach, the scientists demonstrated the benefits of mindfulness using self-reported data:

> We conclude that a group mindfulness meditation training program can enhance functional status and well-being and reduce physical symptoms and psychological distress in a heterogeneous patient population and that the intervention may have long-term beneficial effects.[22]

Little attention was paid in this study to causal mechanisms that could link mindfulness training to improved physical and mental health. Such conclusions only contributed to the growing preliminary endorsements of mindfulness's universal health benefits without adding scientific validation.[23]

Early-stage mindfulness investigations during this decade frequently cited preliminary studies scientifically unrelated to their research. In this way, unreplicated work supported the rationale of later initial studies. Mindfulness investigations were often linked by association rather than scientific progress and concepts. In 2001, Linda Carlson and others researched the impact of mindfulness on mood and stress in cancer outpatients.[24] The rationale adopted by this study was based on the claims made in earlier mindfulness research: 'Quasi-experimental studies suggest that mindfulness meditation may be useful in treating anxiety disorders, chronic pain, fibromyalgia and epilepsy.[25]

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[22] Diane K Reibel and others, 'Mindfulness-Based Stress Reduction and Health-Related Quality of Life in a Heterogeneous Patient Population', *General Hospital Psychiatry*, 23.4 (2001), 183–92 <https://doi.org/10.1016/S0163-8343(01)00149-9>.
[23] Reibel and others. p. 183.
[24] Carlson and others.
[25] Carlson and others. p. 113.

Carlson and others developed their own variant of mindfulness training: 'The intervention consisted of a mindfulness meditation group lasting 1.5 h each week for seven weeks, plus daily home meditation practice.' Although there were some attempts to standardise mindfulness training, it was frequently adapted in different experimental designs.[26] Changing the method to meet individual clinical or experimental contexts could be advantageous, but it made experimental replication problematic. The study's findings were positive: 'This program was effective in decreasing mood disturbance and stress symptoms for up to 6 months in both male and female patients with a wide variety of cancer diagnoses, stages of illness, and educational background, and with disparate ages.'[27] The tone of this and similar studies fed into the notion that mindfulness was a pragmatic panacea. Relatively little attention was given to the scientific explanation of what mindfulness was or how it worked. From this perspective, the potential shift in the quality of mindfulness research, signalled by the 2000 MBCT study, proved to be an exception rather than the start of a new trend.

A key problem in many meditation studies, including that by Carlson and others, is that much practice took place as 'homework', unobserved by the scientists. Being unable to objectively confirm the quality or quantity of training was another source of uncertainty in the MBSR mindfulness paradigm. Carlson and others took advantage of the fluidity of the mindfulness approach. They employed two new psychometric instruments, the Profile of Mood States (POMS) and the Symptoms of Stress Inventory (SOSI). But despite the novelty of their approach, Carlson and others looked to earlier experiments for support of their work:

> Our findings are also consistent with other investigations of similar meditation-based interventions with different medical populations. Kabat-Zinn and colleagues have

[26] For details see the description of the mindfulness method in the 1992 anxiety study, Jon Kabat-Zinn and others, *Effectiveness of a Meditation-Based Stress Reduction Program in the Treatment of Anxiety Disorders*, AmJPsychiatry, 1992, CXLIX.
[27] Carlson and others. p. 113.

> successfully treated anxiety disorders with mindfulness-based stress reduction, and our finding of large decreases in anxiety levels over time supports their results.[28]

This claim of symmetry between mindfulness experiments does not hold up to critical analysis; these were different studies working with diverse populations, used alternative psychometric measures and applied mindfulness training flexibly. Perhaps these early-stage investigations acted as a heuristic for some scientists. Later, we see Carlson participating in two separate projects to establish theoretical frameworks of mindfulness, described in Section 5. This analysis confirms that the improved methodology of the MBCT experiments did not immediately translate to MBI research in general.

As described in the previous chapter, several advantages offset the scientific limitations of Kabat-Zinn's pragmatic MBSR approach. By 2001, MBSR and MBIs were seen as flexible and adaptable; each study could pragmatically deploy and evaluate the benefits of mindfulness on a case-by-case basis. Secondly, by focussing on demonstrating clinical benefits, new MBIs avoided the need for the long-term theoretical and methodological investigations required to establish testable hypotheses capable of establishing scientific causality. In every instance, different interpretations of the value of traditional scientific experiments, such as the RCT model, characterise mindfulness research in this decade.

Despite uncertainties, institutional support for the mindfulness concept grew rapidly during this decade. Mark Williams, one of the architects of MBCT, established The Bangor University Centre for Mindfulness Research and Practice in 2001.[29] MBCT received an endorsement from NICE in 2004.[30] The British Association of Mindfulness-Based Approaches was formed in 2005.[31] Many more organisations that promoted mindfulness or its

[28] Carlson and others. p. 120.
[29] Bangor University.
[30] NICE, 'Overview | Depression in Adults: Treatment and Management'. p.196.
[31] BAMBA, 'About Us', *British Association of Mindfulness-Based Approaches*, 2023 <https://bamba.org.uk/about-us/> [accessed 27 August 2022].

research in different settings followed. Exploring health and social policy support for mindfulness is largely outside the scope of this thesis. Still, the rapid rise in organisations advocating mindfulness research and practice ahead of scientific validation is worthy of closer attention.

An interesting shift supports a hypothesis of rising concerns about the direction of mindfulness research in the first half of the decade. The scientific acceptance of MBCT helped fuel a rapid increase in published mindfulness experiments after 2003. However, most of these studies followed the MBSR trajectory established by Kabat-Zinn, seeking to demonstrate clinical benefits free of causal explanations. In the 2000 MBCT paper by Teasdale and others, the conclusions suggested a synergy between mindfulness research of different qualities and a continuation of a panacea narrative:

> Taken with the results from smaller, or less controlled, evaluations suggesting the effectiveness of the generic MBSR program in treating chronic pain, GAD, and panic, and the effectiveness of a cognitive-behavioral program incorporating a substantial mindfulness component in reducing self-harm in BPD, the present findings suggest that mindfulness-based clinical interventions may hold considerable therapeutic promise, either alone or in combination with other forms of intervention.[32]

However, as time progressed, MBCT represented a contradiction in mindfulness research; it was a scientifically reliable study that supported the clinical benefits of mindfulness but illustrated the limitations in the MBSR experimental paradigm.

From 2003 even MBCT scientists were challenging the uncontrolled proliferation of mindfulness. In an article in *Clinical Psychology: Science and Practice,* Teasdale, Segal, and Williams asked: ‘Can it really be this simple? Does mindfulness training offer to a wide range of clinical problems a single answer that can be applied without any need to formulate the

[32] Teasdale and others. p. 622.

nature of these problems or the way they are to be changed?'[33] Here, we see an initial enthusiasm for a vision of mindfulness as a pragmatic panacea in 2000, which eventually crashes into the problem of scientific validation. During the decade, increased mindfulness research led to more critical evaluations of the experimental evidence supporting positive claims.[34]

Although much of the momentum driving the growth in mindfulness came from within medico-scientific communities, there was also a resurgence in claims of the Buddhist origins of mindfulness. In 2000, Kabat-Zinn argued that there were links between his interpretation of mindfulness and profound religious concepts such as Indra's Net.[35] But Kabat-Zinn also returned to maintaining the Buddhist roots of mindfulness in scientific literature. In his Commentary in support of Baer's mindfulness meta-study in 2003, he reaffirmed the religious foundations of MBSR:

> In this regard, mindfulness certainly received its most explicit and systematic articulation and development within the Buddhist tradition over the past 2,500 years, although its essence lies at the heart of other ancient and contemporary traditions and teachings as well. [36]

In the early years of the 21st Century, MBCT appeared to have offered a more scientifically reliable direction for mindfulness research. Growing scientific interest in mindfulness was primarily based on pragmatic benefits rather than causal explanations, leading

[33] John D. Teasdale, Zindel V. Segal, and J. Mark G. Williams, 'Mindfulness Training and Problem Formulation', *Clinical Psychology: Science and Practice*, 10.2 (2003), 157–60 <https://doi.org/10.1093/clipsy.bpg017>. p. 157.
[34] The case for an understanding of the mechanisms of mindfulness in set out in the introduction of Shapiro and others.
[35] Jon Kabat-Zinn, 'Indra's Net at Work: The Mainstreaming of Dharma Practice in Society', in *The Psychology of Awakening: Buddhism, Science, and Our Day-to-Day Lives* (York Beach, ME, US: Samuel Weiser, 2000), pp. 225–49. Edited Book
[36] Jon Kabat-Zinn, 'Mindfulness-Based Interventions in Context: Past, Present, and Future', *Clinical Psychology: Science and Practice*, 10.2 (2003), 144–56 <https://doi.org/10.1093/clipsy.bpg016>. p. 146.

to a renewed tension between medicalised and traditional advocates. This conflict is characterised by the contrast between the MBSR paradigm and the MBCT approach. At the start of the decade, a renewed push to claim MBSR as the integration of Buddhist and scientific knowledge is visible, ultimately leading to increased uncertainty over mindfulness's theoretical frameworks. Despite scientific concerns, mindfulness was positively received by scientists, social policy agents, and the media throughout the decade, and it has been exported to an increasing number of disciplines.

3. Mindfulness Training as a Clinical Intervention: Concepts

An analysis of Baer's 2003 strategic review of mindfulness research will help to illustrate how the scientific enthusiasm for mindfulness grew despite concerns about the quality of mindfulness research.[37] Baer was a psychologist at the University of Kentucky when she published 'Mindfulness Training as a Clinical Intervention: A Conceptual and Empirical Review' in a special mindfulness edition of *Clinical Psychology* published in June 2003. In the same publication, Kabat-Zinn's Commentary endorsed Baer's findings while making less favourable comments about an earlier, more critical review by Scott Bishop.[38] Baer's account offers a contemporary description of the reception of mindfulness research from the perspective of clinical psychology.[39] The paper is in two parts; part one is analysed in this section and describes the conceptual landscape underpinning mindfulness research. Section 4 analyses the second part, an empirical evaluation of clinical mindfulness research. Baer provided the most influential and detailed review of mindfulness research and practice from the early 2000s.

[37] Baer.
[38] For Kabat-Zinn's Commentary see, Kabat-Zinn, 'Mindfulness-Based Interventions in Context'. For Bishop's mindfulness review see, Bishop.
[39] Baer. p. 144.

In the Introduction, Baer presents the origins of mindfulness as opaque; she mentions Buddhist mindfulness without a detailed discussion of their conceptual or empirical significance.[40] Later in the study, she cites Thich Nhat Hanh's 1975 Buddhist text without any contextualisation of the relationship between medicalised mindfulness and Buddhist knowledge.[41] The study considers mindfulness almost exclusively from the trajectory established by Kabat-Zinn. Mindfulness interventions in experimental and clinical use ahead of Kabat-Zinn and Burney's first mindfulness paper in 1981, described in Chapter 3, are absent.[42] The exclusion of Langarian mindfulness is difficult to understand. As described in previous chapters, Langer was probably the dominant researcher in mindfulness-mindlessness between 1978 and 2000.[43] Although her Western psychological insights differed from Kabat-Zinn's flexible rationale, many elements of Langer's systematic approach, such as developing the mindlessness concept, could have been of value to all mindfulness researchers. Baer acknowledged Langer's development of a theoretical framework but rejected it from consideration in her review:

> Although this concept of mindfulness shares with meditative approaches an emphasis on flexible awareness in the present, several important differences can be noted. Langer's mindfulness interventions usually involve working with material external to the participants, such as information to be learned or manipulated, and often include active, goal-oriented cognitive tasks, such as solving problems. In contrast, the meditation-based approaches described in this review often are directed toward the inner experiences of the individual (e.g., thoughts, emotions) and emphasize a less goal-directed, nonjudgmental observation. [44]

[40] Baer. p. 125.
[41] Baer. p. 127.
[42] Kabat-Zinn and Burney, 'The Clinical Use of Awareness Meditation in the Self-Regulation of Chronic Pain'.
[43] The earliest recorded scientific paper linking Langer to mindfulness: Langer, Blank, and Chanowitz, 'The Mindlessness of Ostensibly Thoughtful Action'.
[44] Baer. p. 126.

Interestingly, in the notes from his Commentary, Kabat-Zinn endorsed Baer's exclusion of Langer's work, refusing even to discuss her approach:

> Following Baer, I will not discuss the social-psychological construct that Langer (1989) has termed "mindfulness," but focus on the traditional usage stemming from Buddhist meditation practices that have been adapted to one degree or another and integrated within the mainstream of medicine over the past 20-plus years.[45]

There are indications here that scientific understanding and acceptance are being managed in an attempt to curate the concept of mindfulness. Kabat-Zinn places Langer's construct in quotation marks, 'mindfulness', and cites a relatively obscure book from 1989.[46] None of the well-received peer-reviewed studies linked to Langer are mentioned. Kabat-Zinn also omits to mention that Langer's published engagement with mindfulness predates his own.[47] Although Kabat-Zinn describes his version as 'traditional', the extent to which it reflects Eastern traditional practices was never defined. It is worth noting that Langarian models sometimes considered the use of mindfulness 'without meditation'.[48] Given that mindfulness meditation was positioned as a panacea, evidence that other activities or behaviours might mediate state or trait mindfulness may have challenged medicalised mindfulness's role and status. It appears that Baer and Kabat-Zinn attempted to establish one authoritative vision of mindfulness, excluding other understandings from their narrative while maintaining an unevidenced link with traditional Buddhist practices.

Having established a frame of reference, Baer synthesised the available descriptions of mindfulness into one accessible phrase. She suggested: 'Thus, mindfulness is the

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[45] Kabat-Zinn, 'Mindfulness-Based Interventions in Context'. p. 153.
[46] Ellen Langer, *Mindfulness and Mindlessness* (Reading, MA: Addison Wesley, 1989).
[47] For example, Ellen J. Langer and Lois Imber, 'Role of Mindlessness in the Perception of Deviance', *Journal of Personality and Social Psychology*, 39.3 (1980), 360–67 <https://doi.org/10.1037/0022-3514.39.3.360>.
[48] Ellen J. Langer, 'Mindful Learning', *Current Directions in Psychological Science*, 9.6 (2000), 220–23 <https://doi.org/10.1111/1467-8721.00099>. p. 220.

nonjudgmental observation of the ongoing stream of internal and external stimuli as they arise.'[49] Attempting to establish a definition of an intervention 24 years after its first clinical use indicates the freedom with which mindfulness evolved. The literature suggests a strategy of establishing Kabat-Zinn's work as foundational to Westernised scientific understanding of Eastern mindfulness without ever scientifically defining the original concept.

Throughout the paper, theoretical discussions of mindfulness were linked to human experiences and modalities of treatments more often than cognitive explanations or causal mechanisms. This narrative was close to Kabat-Zinn's pragmatic approach and, in places, lacked a positivist insight. For example, in situating the early use of mindfulness in the regulation of chronic pain, Baer mixes cognitive and Buddhist concepts:

> Several authors have noted that the practice of mindfulness may lead to changes in thought patterns, or in attitudes about one's thoughts. For example, Kabat-Zinn suggests that nonjudgmental observation of pain and anxiety-related thoughts may lead to the understanding that they are "just thoughts," rather than reflections of truth or reality, and do not necessitate escape or avoidance behavior.[50]

These ideas did not rely on data or robust replication but on the views of scientists and clinicians as explanatory narratives. Baer describes the MBSR concept with terms such as 'Kabbat-Zinn suggests' and 'may lead', indicating uncertainty in theoretical understanding.[51] Baer, in places, uses non-scientific and non-peer-reviewed literature to complement scientific and clinical ideas, referencing Hanh's 1975 mindfulness book and Kabat-Zinn's 1990 self-help guide, *Full Catastrophe Living*.[52]

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[49] Baer. p. 125.
[50] Baer. p. 129.
[51] Baer. p. 129.
[52] See both Thich Nhat Hanh, *The Miracle of Mindfulness! : A Manual of Meditation / Thich Nhat Hanh ; Translated by Mobi Warren ; with Drawings by Vo Dinh* (Boston: Boston : Beacon Press, 1976). and Kabat-Zinn, *Full Catastrophe Living*.

The closing stages of Baer's conceptual review described several interventions which illustrated the range of mindfulness research and practice at that time: Dialectical Behaviour Therapy (DBT), Acceptance and Commitment Therapy (ACT) and Relapse Prevention (RP). Across the review, pulling so many disparate concepts into one mindfulness narrative, the consistency problem in mindfulness research is laid bare. For example, as Baer indicated, DBT used different approaches to MBSR and most other MBIs:

> Thus, DBT does not prescribe a specific frequency or duration of mindfulness practice. Instead, goals for mindfulness practice are established by individual clients and their therapists. DBT offers numerous mindfulness exercises from which clients may choose (some adapted from Hanh).[53]

The DBT example indicates that mindfulness was also positioned as a new way of working with mental health. This approach is almost diametrically opposed to MBCT, where common conceptual and methodological understandings are secondary to subjective evaluation of clinical effectiveness.

In the Conclusions, Baer calls for more well-conducted studies, but the presence of the mindfulness paradox is visible as she positions the intervention as almost inaccessible to a positivist investigation because of its belief-based origins:

> The preceding discussion illustrates that mindfulness-based interventions can be rigorously operationalized, conceptualized, and empirically evaluated. However, to do so risks overlooking important elements of the long tradition from which mindfulness meditation originates. As described by Kabat-Zinn, the practice of mindfulness meditation is concerned with the cultivation of awareness, insight, wisdom, and compassion, concepts that may be appreciated and valued by many people yet difficult to evaluate empirically. Thus, although methodologically rigorous investigations of the effects of MBSR are both possible and necessary, perhaps researchers should consider ways to incorporate these other concepts, in addition to more readily measured constructs such as symptom reduction.[54]

[53] Baer. p. 127.
[54] Baer. p. 140.

Without robust scientific support, mindfulness is being presented as both scientifically validated and abstract to positivist investigation. Baer offers no details about the 'long tradition' from which mindfulness originated, nor are any Buddhist mindfulness methods named or described. There is a claim that mindfulness 'could be rigorously operationalized, conceptualized, and empirically evaluated', although Baer failed to show this in her review. She also maintained that the components of the practice would be hard to evaluate empirically. The suggestion that new epistemological and ontological approaches might be necessary is interesting but challenging. For example, if the existing psychological approaches were not fit for purpose, what sense could be made of the previous decades of mindfulness research? Through this statement, Baer appears to be arguing that mindfulness could and could not be scientifically validated; in doing so, she has probably described the root cause of the mindfulness paradox.

4. Baer's Mindfulness Training as a Clinical Intervention: Experiments

Part two of Baer's study empirically evaluated mindfulness research. Its value to this thesis is to share data demonstrating the effectiveness of mindfulness treatments across a range of experiments, presenting an overview of the field in 2003. A secondary goal is to explore the interpretation of this data from a clinical psychological perspective. In such a complex and fragmented area, using a meta-analysis methodology and excluding unpublished work simplified Baer's task. She explained the data collection stage of the meta-study quite simply:

> Meta-analytic procedures were incorporated to facilitate quantification of findings and comparisons across studies. To locate relevant studies, a computer search (using

PsycInfo and Medline databases) was conducted of articles and chapters including the terms mindfulness or meditation.[55]

Baer identified twenty-one studies that either compared the before and after effects, or the impact of mindfulness training compared with a non-mindfulness (control) group. No other forms of meditation were evaluated. The statistical treatment of the data from these research projects used a range of methods to establish the effect sizes of individual experiments through mean (*M*) results or standard deviation (*SD)* between the two groups in each experiment (before - after or mindfulness - non-mindfulness). Where establishing the *M* or *SD* was impossible, the effect sizes were calculated from the significance level (*p*). Although not a perfect method, this approach is used in meta-studies where comparisons are needed between experiments using different effect sizes and variables.[56] To clarify: *M* is the sum of all numbers in a data set divided by the number of values in that set, *SD* is a measure of variance or dispersion in a group of values, and the (*p*) value reflects the probability that the experimental outcome would have occurred by chance. An effect size of 1.0 indicated the treatment group scored, on average, one *SD* better than the comparison group—a positive score reflecting the efficacy of the mindfulness treatments. Effect sizes were calculated post-treatment and after a longer interval described as 'follow-up'. Mindfulness patients often maintained their practice after eight or ten weeks of treatment. So, follow-up represents long-term clinical benefits. Methodological problems observed in the original experiments included a lack of controls, low participant numbers, the treatment integrity and a failure to address the issue of clinical significance.[57]

[55] Baer. p. 131.
[56] The *M* is the sum of all numbers in a data set divided by the number of values. The *SD* is a measure of variance or dispersion in a set of values and the *p* value reflects the probability that the experimental outcome would have occurred by chance. For full descriptions see Robert Rosenthal and Donald B. Rubin, 'Meta-Analytic Procedures for Combining Studies with Multiple Effect Sizes', *Psychological Bulletin*, 99.3 (1986), 400–406 <https://doi.org/10.1037/0033-2909.99.3.400>.
[57] Baer. p. 138.

Surprisingly, little attention was given to the lack of randomisation and dependence on self-reported measures.

Most effect sizes presented through this investigation suggested positive changes correlated to the clinical use of mindfulness. Baer's analysis described the benefits of mindfulness post-treatment: individual effect sizes were calculated from 0.15 to 1.65, and their mean was 0.74 (*SD* = 0.39).[58] And the results from the follow-up analysis were equally promising (Figure 13). Baer described the follow-up effect sizes thus:

> Effect sizes at follow-up ranged from 0.08 to 1.35. Before an overall mean of these effect sizes was calculated, mean effect sizes obtained from studies with overlapping participant samples were averaged. The overall mean of these independent follow-up effect sizes was 0.59 (*SD* = 0.41).[59]

Baer concluded her analysis with conditional optimism, continuing the long-standing premise that the evidence for the benefits of mindfulness, after 20 years since its introduction, were promising but not proven.[60] Baer's review is a useful survey of mindfulness research, but one of my concerns is the absence of robust scientific validation to support this optimism. In 2003, medicalised mindfulness had been an object of scientific interest since 1979, but Baer's review does not explain why so many studies with 'significant methodological flaws' were published and later cited.[61] Baer identified the lack of a stable theoretical framework as a problem. In keeping with the MBSR paradigm, the review did not attempt to explain scientifically what mindfulness was and how clinical benefits across a wide range of health conditions were reached.

[58] Baer. p. 134.
[59] Baer. p. 135.
[60] Baer. p. 139.
[61] Baer. p. 139.

Mean Effect Size at Post-treatment and Methodological Variables			
	N	*Mean d*	*SD*
Research design			
Pre-post	8	.71	0.44
Between group	10	0.69	0.34
Random assignment (between-group)			
Yes	7	0.75	0.34
No	3	0.55	0.38
Type of control group			
Wait list	5	0.74	0.44
TAU	4	0.55	0.20
Participant population			
Chronic pain	4	0.37	0.24
Other Axis I[a]	4	0.96	0.47
Medical[b]	4	0.55	0.09
Nonclinical	4	0.92	0.44
Dependent measure			
Pain	17	0.31	0.30
Other medical (self-rated)[d]	11	0.44	0.26
Anxiety	8	0.70	0.41
Depression	5	0.86	0.30
Stress	2	0.63	0.02
Global psychological[e]	18	0.64	0.42
Objective medical[f]	2	0.80	0.25
Method of Calculating *d*			
Using *M*s and *SD*s, or *t*	10	0.87	0.40
Using *p*	8	0.48	0.22

[a]Includes anxiety, depression, and binge eating.
[b]Includes fibromyalgia, psoriasis, and cancer.
[c]Includes students and non-clinical volunteers.
[d]Includes fatigue and sleep ratings, and medical symptom checklist.
[e]Includes POMS total mood disturbance, SCL-90-R GSI.
[f]Includes urine and skin analysis.

Fig. 13. Data from Baer's 2003 paper (Table 2: Mean effect size at posttreatment and methodological variables. The follow-up data. *N* = the number of studies, *Mean d* = mean effect size and *SD* = the standard deviation of effect size.[62]

With historical hindsight, Baer was not alone in characterising mindfulness research as promising. The mantra used by many reviewers to explain the limitations of mindfulness experiments was that more (better quality) research would fix the problem. Dozens, perhaps

[62] Baer. p. 136.

more than a hundred meta-studies over the following 15 years, highlighted major limitations in MBI research. Still, it was not until 2017 that the full implications of the mindfulness paradox were fully revealed in critical investigations.[63]

5. Medicalised Mindfulness in the 21st Century: Still Balancing Belief and Science.

It appeared in 2000 that MBCT offered mindfulness scientists a new experimental trajectory—a return to traditional scientific values and processes. However, Baer reintroduced the idea that Kabat-Zinn had built MBSR from Buddhist knowledge, increasing theoretical uncertainty. In 2002, Bishop, an Assistant Professor of Psychiatry at the University of Toronto, identified limitations in MBSR in his strategic review, 'What Do We Really Know About Mindfulness-Based Stress Reduction', published in the *Psychosomatic Medicine* Journal.[64] Writing a year earlier than Baer, Bishop was less enthusiastic regarding mindfulness's potential:

> Replication is clearly needed to firmly establish its efficacy in this population. Clinicians are cautioned further against generalizing the efficacy of this approach based on this study to other chronic illnesses. The efficacy of MBSR should be investigated in each illness that it was adapted for until it has been shown that the treatment effects can generalize across illnesses.[65]

Bishop pushed back against the concept of MBSR as a scientifically validated panacea. Kabat-Zinn's reception of Bishop's insights differed greatly from the encouragement he offered Baer. Writing in his 2003 Commentary, he said of Baer's paper: 'I find the Baer review to be

[63] Cresswell produced a scathing critical reviews of mindfulness research in 2017, see: Creswell. p. 509.
[64] Bishop.
[65] Bishop. pps 76 – 77.

evenhanded, cogent, and perceptive in its description and evaluation of the work that has been published through the middle of 2001, work that features mindfulness training as the primary element in various clinical interventions.'[66] In comparing the work of Bishop and Baer, Kabat-Zinn wrote:

> It complements nicely the recent review by Bishop, which to my mind ignores some of the most important, if difficult to define, features of such interventions in its emphasis on the perceived need to reduce to a clinical algorithm the complexity of the practice and nuanced delivery of mindfulness-based stress reduction (MBSR).[67]

In the above quotation, Kabat-Zinn repeats the argument made by Baer that MBSR is 'difficult to define', the practice is considered complex, and the training delivery is 'nuanced'. None of these observations were scientific. There is also an implied criticism of reductionism, a central principle of cognitive psychology. While Kabat-Zinn had claimed scientific validation for MBSR during the first twenty years of his mindfulness research, he now indicates that the intervention may also sit outside of positivist paradigms and require special handling. The originally claimed congruence between scientific and Buddhist knowledge from 1982 was replaced in 2003 by the idea that mindfulness might be inaccessible to traditional scientific investigation. Or, at the very least, could not be evaluated through reductive methodologies typical of clinical studies.

This latest explanation of how the paradox was established offers a potential model for the trajectory of mindfulness. It explains why proof of the benefits was so hard to evidence, thus leading to many mindfulness experiments remaining promising but unproven. A tentative summary of this process is described below and summarised in Figure 14: i) mindfulness was created as a hybrid intervention based on an interpretation of Buddhist practices within a

[66] Kabat-Zinn, 'Mindfulness-Based Interventions in Context'. p. 144.
[67] Kabat-Zinn, 'Mindfulness-Based Interventions in Context'. p. 144.

positivist paradigm, ii) Ontological conflicts between Buddhist and scientific knowledge systems made a stable understanding of MBSR unlikely, iii) thus, uncoupled from scientific and Buddhist theoretical frameworks, a hypothesis of what mindfulness was could not be established, iv) therefore, replication and proof of the benefits of mindfulness could not be scientifically validated.

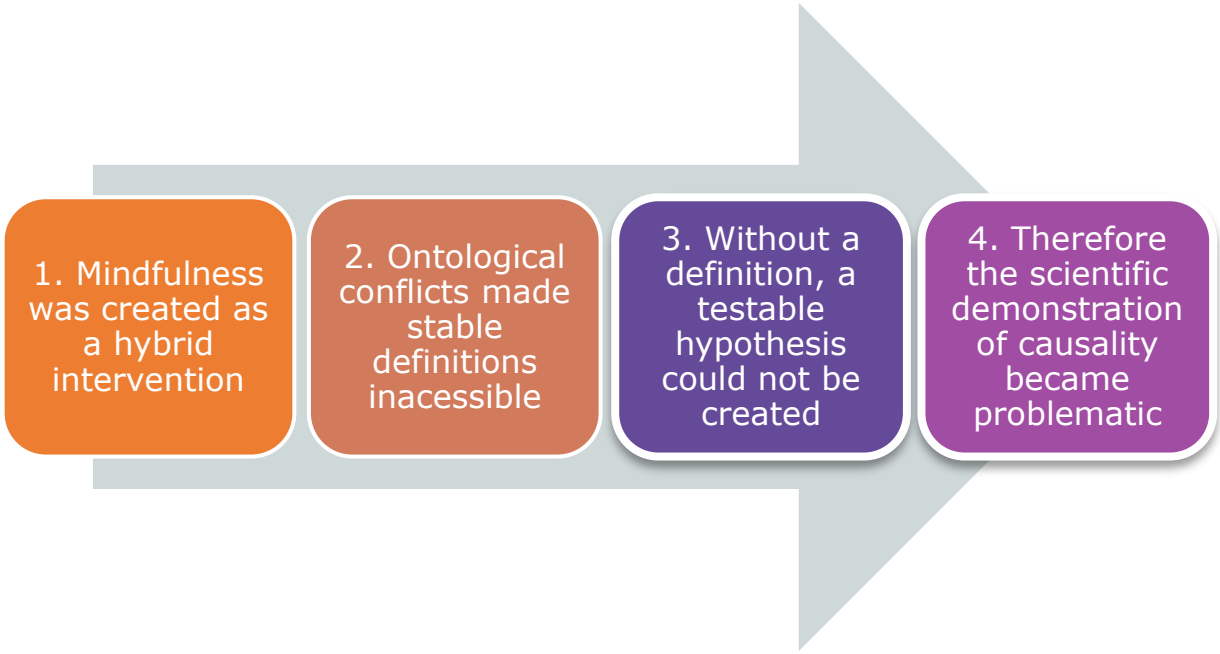

Fig. 14. A proposed explanation of ontological incongruence limiting the scientific validation of mindfulness.

The presentation of MBSR as a Buddhist-based intervention is not an abstract or philosophical issue; it is probably the key factor in the lack of mindfulness replication and a failure to develop testable hypotheses. However, the ontological conflict created by the bridging theory does not explain the methodological problems in mindfulness experiments, such as the lack of controls and low participant numbers. It may be that a large amount of preliminary research published after 2001 followed the initial MBSR experiments, establishing a paradigm despite its obvious methodological and theoretical limitations. Those scientists who

evidenced mindfulness's health benefits through robust scientific approaches, such as the authors of MBCT studies, were relatively few in this decade.

6. In Search of a Theoretical Framework

Methodological and theoretical issues in mindfulness research are sometimes treated separately in meta-studies but are inextricably linked. Experimental enquiry is likely limited if scientists lack a clear understanding of causal mechanisms, such as how MBSR training helps to mediate the experience of chronic pain. Lacking an overarching explanation of mindfulness as a therapy, MBCT scientists created a treatment-specific hypothesis based on traditional cognitive approaches.[68] However, Teasdale and others failed to establish a testable hypothesis that could prove a causal link between mindfulness training and observed health benefits. As the decade progressed, establishing a theoretical framework to support mindfulness experiments became a pressing issue. In 2004, Bishop and others (including Zindel Segal) described their attempt to create a testable definition for mindfulness in the *Clinical Psychology: Science and Practice* journal:

> This paper describes the results of recent meetings held to establish a consensus on mindfulness and to develop conjointly a testable operational definition. We propose a two-component model of mindfulness and specify each component in terms of specific behaviors, experiential manifestations, and implicated psychological processes.[69]

The presence of Segal among the co-authors should not be underestimated; he helped to establish a condition-specific theoretical framework for MBCT. One of the implications of the

[68] Teasdale and others.
[69] Bishop and others.

study by Bishop and others was that without 'a testable operational definition' of mindfulness, experimental results would be of limited value and challenging to replicate. However, there was little enthusiasm for the findings of this study. Mindfulness research was still concentrated on demonstrations of clinical potential, not cause and effect. A different approach to developing a stable theoretical framework was put forward in 2006 by Shapiro and others.

Shapiro, Linda Carlson, John Astin and Benedict Freedman outlined a simple objective in the abstract of their investigation: 'This theoretical paper proposes a model of mindfulness in an effort to elucidate potential mechanisms to explain how mindfulness affects positive change.'[70] The lack of clarity surrounding the mindfulness concept in the scientific literature, published over the previous 25 years, led the researchers to attempt to reverse engineer a draft theoretical framework based on Kabat-Zinn's explanation from a self-help guide.[71] From a historical perspective, these seem like drastic measures reflecting a reluctance by Kabat-Zinn and others to provide details of exactly which meditation practices MBSR was inspired by.

Their study, 'Mechanisms of Mindfulness', is among the most cited peer-reviewed mindfulness papers published between 2001 and 2010. The rationale was a two-pronged approach:

> Investigating questions concerning the mechanisms of action underlying mindfulness based interventions will require two different but complementary lines of inquiry. Dismantle studies are necessary in order to separate and compare the various active ingredients in mindfulness-based interventions such as social support, relaxation, and cognitive behavioral elements. A second line of inquiry is examining the central construct of mindfulness itself to determine if the development of "mindfulness" is what actually leads to the positive changes that have been observed.[72]

[70] Shapiro and others. p. 373.
[71] Shapiro and others. p. 374.
[72] Shapiro and others. p. 374.

The deconstruction of Kabat-Zinn's definition of mindfulness in this study drew on the explanation used in his 1994 book *Wherever You Go, There You Are: Mindfulness Meditation in Everyday Life*: 'paying attention in a particular way: on purpose, in the present moment, and non-judgmentally.'[73] The analysis of this definition led to the development of a three-axiom model of mindfulness based on intention, attention and attitude (IAA). Shapiro and others imagined the axioms working in concert rather than as separate parts of a linear process. (Figure 15). The paper's authors then described the over-arching 'meta-mechanism' that the three axioms created (or were created by), which they called 'reperceiving'. Reperceiving was positioned as the transformative engine of the meditation practice, the concept likely to deliver the health and wellbeing changes often claimed in mindfulness research.[74]

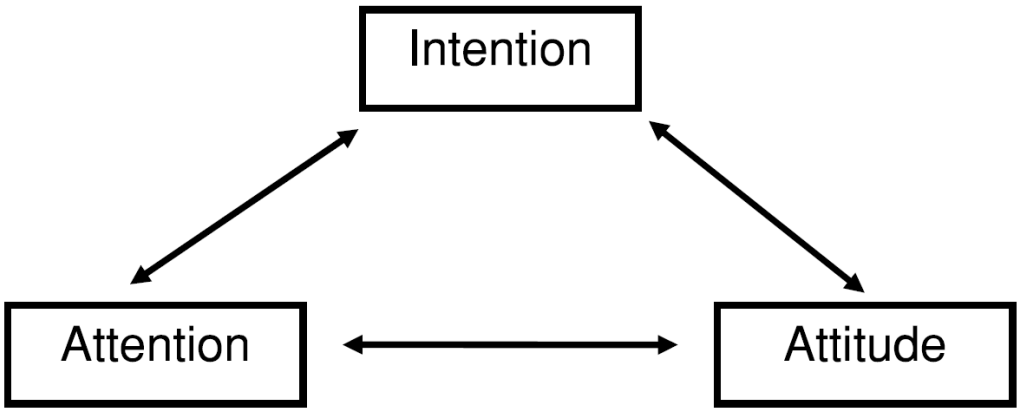

Figure 1. The three axioms of mindfulness, Intention, Attention, and Attitude, are not separate stages. They are interwoven aspects of a single cyclic process and occur simultaneously. Mindfulness is this moment-to-moment process.

Fig. 15. The three-axion model of mindfulness with their original description (below) developed by Shapiro and others in 2006.[75]

[73] Jon Kabat-Zinn, 'Wherever You Go ,There You Are:Mindfulness Meditation in Every-Day Life.Hyperion', *Hyperion*, 1994. p. 4.
[74] Shapiro and others. p. 377.
[75] Shapiro and others.

The reperceiving hypothesis can be criticised for a lack of empirical support. However, this paper aimed to begin the conversation of what a scientifically validated explanation might look like rather than offering a finely crafted concept.

In attempting to establish the underlying mechanisms, Shapiro and others highlighted problems in the relocation of mindfulness. In discussing the 'intention' axiom, the scientists reported:

> When Western psychology attempted to extract the essence of mindfulness practice from its original religious/cultural roots, we lost, to some extent, the aspect of intention, which for Buddhism was enlightenment and compassion for all beings. It seems valuable to explicitly bring this aspect back into our model.[76]

Here, 'Western psychology' means Kabat-Zinn's approach, as his claim to have relocated mindfulness was foundational to the MBSR paradigm. This statement challenged many of the claims made by Kabat-Zinn about Buddhism and, thus, the nature of medicalised mindfulness and its scientific trajectory. It also mirrors many criticisms of Kabat-Zinn's claims about the Buddhist nature of mindfulness illustrated in Chapter 1. Shapiro and others also explained how Kabat-Zinn's understanding and use of Buddhist knowledge changed over time. They observed this fluidity in his 1990 self-help guide *Full Catastrophe Living*:

> As Kabat-Zinn writes, "Your intentions set the stage for what is possible. They remind you from moment to moment of why you are practicing in the first place" (p. 32). He continues, "I used to think that meditation practice was so powerful . . . that as long as you did it at all, you would see growth and change. But time has taught me that some kind of personal vision is also necessary".[77]

[76] Shapiro and others.
[77] Shapiro and others. p. 375

This citation indicates that Kabat-Zinn expressed a personal view of Buddhist meditation, which changed over time. So, although his first exposition of MBSR in 1982 made overarching claims about the relationship between belief and science, his knowledge at that time was preliminary. The insights of scholars such as Richard King later argued that Kabat-Zinn omitted key cognitive elements when relocating mindfulness, such as compassion and ethics.[78] By the decade's end, hundreds of published studies had followed the Kabat-Zinn paradigm and produced positive preliminary results despite theoretical limitations.

7. MBCT the Mindfulness Flagship: Promising or Proven?

The most influential scientific validation of mindfulness was the acceptance of MBCT as a preventative treatment for depressive relapses by NICE, leading to its availability within the NHS.[79] After two decades of relative scientific indifference to MBSR, NICE's endorsement was a major shift in the perception of the clinical value of mindfulness. NICE's endorsement was a powerful statement about the reliability of early MBCT research. Michael Rawlins, a former Chair of NICE, described the robust scientific approach employed by the organisation:

> All National Institute for Clinical Excellence guidance is based on an exhaustive review of the available evidence. This usually involves, for each piece of guidance, one or more systematic reviews of the available literature. Where appropriate, relevant unpublished data are also included. In developing a clinical guideline, a dozen or more systematic reviews may be required to ensure that all the appropriate evidence has been considered.[80]

[78] King, '"Paying Attention" in a Digital Economy: Reflections on the Role of Analysis and Judgement Within Contemporary Discourses of Mindfulness and Comparisons with Classical Buddhist Accounts of Sati'
[79] Crane and Kuyken.
[80] Michael D Rawlins, 'National Institute for Clinical Excellence: NICE Works', *Journal of the Royal Society of Medicine*, 108.6 (2015), 211–19 <https://doi.org/10.1177/0141076815587658>. p. 213.

Since their publication in 2004, the NICE guidelines for the treatment of depression have been updated several times. Evidence supporting the use of MBCT sits within the rationale for the Treatments for Depression in Adults, subsection C, which focuses on preventing relapse.[81] The most recent version of the guidelines, NG222, was published in 2022, and many experiments are cited in support of the benefits of MBCT.[82] However, the NICE literature references only two studies published before 2005; they appear to constitute the original evidence for MBCT's approval—the 2000 MBCT paper by Teasdale and others.[83] Also, a replication of that study was conducted by Helen Ma and Teasdale.[84] In 2004, Ma and Teasdale worked at the Medical Research Council, Cognition and Brain Sciences Unit, a leading cognitive research institution.[85] The 2004 experiments replicated both the positive and negative findings from 2000, including problems with the controls:

> A limitation of the present study, as of the original Teasdale et al. (2000) trial, is that the lack of another group intervention comparison condition, matched to MBCT for exposure to therapist and group support, means that the effects of the nonspecific factors of MBCT, such as group support and therapeutic alliance, cannot be assessed. It follows that the beneficial effects of MBCT cannot be unambiguously attributed to its specific components rather than to more nonspecific factors.[86]

This evidence was sufficient for NICE's endorsement, but its reception by the wider scientific community was far more mixed. Baer highlighted the relative merits of MBCT research compared to other mindfulness experiments in her 2003 meta-study.[87] She described the intervention cautiously: 'MBCT may be approaching the "probably efficacious" designation

[81] NICE, 'Overview | Depression in Adults: Treatment and Management'. p. 196.
[82] NICE, 'Overview | Depression in Adults: Treatment and Management'. p. 196.
[83] John D. Teasdale and others.
[84] S. Helen Ma and John D. Teasdale, 'Mindfulness-Based Cognitive Therapy for Depression: Replication and Exploration of Differential Relapse Prevention Effects', *Journal of Consulting and Clinical Psychology*, 72.1 (2004), 31–40 <https://doi.org/10.1037/0022-006X.72.1.31>.
[85] Ma and Teasdale.
[86] Ma and Teasdale. p. 38.
[87] Baer.

for the prevention of depressive relapse.'[88] However, Helen Coelho and others from the Peninsula College of Medicine & Dentistry, Universities of Exeter & Plymouth, Exeter published a review of MBSR research in 2007, three years after its endorsement by NICE.[89] While the study confirmed therapeutic benefits were experienced by patients receiving MBCT, a causal relationship between the treatment and the results could not be established:

> Evidence suggested that for patients with three or more previous depressive episodes, mindfulness-based cognitive therapy had an additive benefit to usual care. However, because of the nature of the control groups, the findings could not be attributed to mindfulness-based cognitive therapy-specific effects. Further research was necessary to clarify whether mindfulness-based cognitive therapy produced any specific effects.[90]

Demonstrating curative benefits without causality can lead to scientific uncertainty. Not knowing why a patient's condition improves following treatment allows for the possibility that factors such as a placebo effect produce the improvement.

Some strategic reviews made encouraging claims about the wider potential of MBCT but were rarely conclusive. For example, the study published in 2006 by Cheryl Shigaki and others suggested that MBCT was at risk of being characterised as a promising but unproven intervention: 'Despite these encouraging findings, experts agree that continued research is needed, especially controlled studies with more rigorous methodology.' [91] An issue supported by meditation researchers Alberto Chiesa and Alessandro Serretti in their 2010 review of MBCT research titled 'Mindfulness Based Cognitive Therapy for Major Depression: A

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[88] Baer. p. 140.
[89] Helen. F. Coelho, Peter. H. Canter, and Edzard Ernst, *Mindfulness-Based Cognitive Therapy: Evaluating Current Evidence and Informing Future Research*, *Database of Abstracts of Reviews of Effects (DARE): Quality-Assessed Reviews [Internet]* (Centre for Reviews and Dissemination (UK), 2007) <https://www.ncbi.nlm.nih.gov/books/NBK73720/> [accessed 28 June 2022].
[90] Coelho, Canter, and Ernst.
[91] Cheryl L. Shigaki, Bret Glass, and Laura H. Schopp, 'Mindfulness-Based Stress Reduction in Medical Settings', *Journal of Clinical Psychology in Medical Settings*, 13.3 (2006), 209–16 <https://doi.org/10.1007/s10880-006-9033-8>. p. 209.

Systematic Review and Meta-Analysis'. Despite the status of MBSR as scientifically validated, there were still many unresolved issues:

> However, methodological shortcomings of reviewed studies including small sample size, frequent lack of replications and the absence of studies comparing MBCT to control groups designed to distinguish specific from non specific effects of meditation imply the necessity for further research.[92]

MBCT was launched into new clinical areas unrelated to depressive relapse. However, systematic reviews continued to argue that MBCT showed promise in these other contexts, but more research was needed.[93] The takeaway point is that despite the NICE endorsement, replicated scientific evidence was in short supply. Although outside the scope of this thesis, a clearer understanding of the scientific basis on which NICE endorsed MBCT might be illuminating. Alongside the clinical value of MBCT in this decade, progress was also made in establishing the cost savings possible through using MBCT as a group intervention compared to other treatments.[94] Despite the value of MBCT to the scientific credibility of the mindfulness concept, by the decade's end, understandings were even less clear. In their 2009 paper, Rapgay and Bystrisky argued that proliferation was part of the problem in understanding mindfulness: 'If the empirical study of mindfulness is to progress, it is important to address the emerging challenge of operationalizing mindfulness before the field becomes even more confusing with the proliferation of mindfulness practices.'[95]

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[92] A. Chiesa and A. Serretti, 'P02-336 - Mindfulness Based Cognitive Therapy for Major Depression: A Systematic Review and Meta-Analysis', *European Psychiatry*, 25.S1 (2010), 1–1 <https://doi.org/10.1016/S0924-9338(10)71035-X>.

[93] Mark A. Craigie and others, 'Mindfulness-Based Cognitive Therapy for Generalized Anxiety Disorder: A Preliminary Evaluation', *Behavioural and Cognitive Psychotherapy*, 36.5 (2008), 553–68 <https://doi.org/10.1017/S135246580800458X>. p. 553

[94] Willem Kuyken and others, 'Mindfulness-Based Cognitive Therapy to Prevent Relapse in Recurrent Depression', *Journal of Consulting and Clinical Psychology*, 76.6 (2008), 966–78 <https://doi.org/10.1037/a0013786>.

[95] Rapgay and Bystrisky. p. 160.

8. Conclusions

Between 2003 and 2010, there was an almost tenfold increase in academic publications linked to mindfulness indexed in the Scopus database. At the start of the decade, there were few signs of political support for the mindfulness concept or socio-cultural changes drawing mindfulness further into the scientific mainstream. The increase in interest appears to have been primarily generated from within the medico-scientific community. The positive reception of the MBCT experiments increased the scientific status of mindfulness. With the acceptance of MBCT by NICE for use in the NHS in 2004, mindfulness had been elevated to the therapeutic mainstream. Teasdale and others demonstrated the curative potential of mindfulness when combined with CBT by using a robust scientific methodology, RCT. The MBCT study published in 2000 produced the most scientifically reliable data on the health benefits of mindfulness up to that point. MBCT was a shift away from the Kabat-Zinn medicalised paradigm and illustrated that improved scientific reliability could lead to greater scientific acceptance of the mindfulness concept. However, the early MBCT studies did not deliver a testable hypotheses to 'prove' the relationship between mindfulness and clinical benefits. Ironically, MBCT highlighted the low quality of mindfulness research between 1979 and 2000. It appears that the tension between medicalised and traditional scientific investigation of meditation seen in the 1970s and early 1980s was reintroduced by MBCT.

By proposing a theoretical framework for MBCT, Teasdale and others demonstrated that mindfulness research could step outside the uncertainty established by Kabat-Zinn's bridging hypothesis. Rather than inspiring mindfulness scientists to produce more reliable experiments, there was resistance to following the MBCT trajectory. After 2000, in scientific settings, Kabat-Zinn returned to asserting the Buddhist influence in mindfulness research and practice. This idea led to greater theoretical uncertainty and signposted medicalised

mindfulness research away from a more positivist trajectory. The rejection of Bishop's calls for more robust scientific validation alongside the acceptance of Baer's transdisciplinary insights illustrates Kabat-Zinn's ideas in 2003. Approving the removal of Langarian mindfulness from Baer's review likely confirms this adjustment away from a purely scientific approach in the trajectory of the MBSR paradigm. While MBCT's acceptance led to a growth in published mindfulness experiments, most followed the MBSR and not the MBCT approach.

In 2003, Kabat-Zinn and Baer raised concerns about the ability of experimental psychology to investigate the mindfulness concept fully. However, at the same time, the positive results from preliminary studies were used as indications of mindfulness's benefits. I believe we see the consolidation and strengthening of the paradox at this time. Medicalised mindfulness was dependent on scientific acceptance, yet robust RCT investigations could not be undertaken without establishing stable theoretical frameworks. Therefore, we see an attempt to demonstrate the benefits of mindfulness through early-stage, pragmatic research, leading to the continuation of the promising but not proven narrative.

The dramatic growth in mindfulness research after 2003 cannot be explained solely by the increased confidence of some scientists in MBCT and its subsequent adoption by NICE and the NHS. Two additional factors visible in the literature may have been powerful incentives for scientists, clinicians, and institutions to support the concept: the claims that mindfulness could be a panacea and offer cost savings compared to other treatments. Studies showed that mindfulness, particularly deployed as a group therapy, might be significantly cheaper than alternatives such as CBT. In this decade, there was a correlation between the growth in mindfulness research and media interest; such a relationship likely promoted the value of the concept to scientific and non-scientific audiences. For mindfulness advocates, every new preliminary claim for its benefits was a further indication of the panacea hypothesis. For the sceptics of the MBSR paradigm, positive findings based on early-stage pragmatic research

underlined systematic problems in mindfulness research. Establishing a simple, low-cost treatment that could profoundly affect human health would be a major clinical advancement and partly explains the growth in mindfulness research. However, the pursuit of the imagined potential of mindfulness led to limitations in scientific practices. There are signs that scientists got caught up in the initial enthusiastic claims for mindfulness's widespread benefits, only to later push back against unevidenced generalisations about its health potential.

Confusion regarding the benefits of mindfulness was compounded by two separate methodological problems visible in experiments. Firstly, early-stage research had general limitations, such as low participant numbers or a lack of controls and randomisation. This approach made evidencing the therapeutic benefits of mindfulness difficult, but this limitation could be improved by introducing more robust RCT-type experiments. The second area of concern was uncertainty brought about by the absence of a scientific or cognitive model of MBSR or individual MBIs. Without a testable hypothesis of how mindfulness worked and mediated health, establishing the cause of clinical changes observed in experiments was difficult. Both of these methodological problems are visible in many mindfulness experiments, but establishing a theoretical understanding of what mindfulness was became an increasingly complex challenge.

The recommendations in meta-studies and mindfulness reviews frequently urged for more, better quality experiments. However, some scientists realised that the Achilles' heel in the mindfulness paradigm was the lack of an overarching theoretical framework that could explain how mindfulness worked—Kabat-Zinn's responses in 2003 to Baer's and Bishop's mindfulness reviews created even greater uncertainty. Kabat-Zinn defended Baer's view that the benefits of the intervention could be 'empirically evaluated' but that some of its unevidenced operational components: 'awareness, insight, wisdom, and compassion' could not. There are signs that MBSR's status as pragmatic and somewhat inaccessible to reductive

scientific enquiry was maintained by the claimed relationship between Buddhism and science. Alongside problems in aligning mindfulness with established scientific understandings, uncertainty about mindfulness's Buddhist foundations also grew in this decade.

Baer's 2003 review is a useful survey of mindfulness research; however, without explaining why experiments failed to deliver scientific validation, encouraging more, better quality research lacked a clear rationale and vision for the future. Several attempts to establish a viable theoretical framework for mindfulness were published during this decade. The mechanisms of mindfulness project by Shapiro and others, beginning in 2007, attempted to reverse engineer theoretical and operational understandings based on one of Kabat-Zinn's definitions from a mindfulness self-help book. Almost three decades after MBSR was first used as a clinical intervention, scientists tried to piece together what mindfulness was. While some preliminary work was undertaken to align mindfulness with psychological constructs in this study, limitations in Kabat-Zinn's understanding and application of Buddhist knowledge were also highlighted. Rather than bridging science and belief, MBSR appeared to lack a clear conceptual relationship with either science or Buddhism.

The scientific acceptance of MBCT illustrates a simple resolution to this problem. By abandoning Kabat-Zinn's bridging hypothesis, mindfulness researchers could step outside of the paradox and continue in a more traditional scientific manner. Conversely, scientists convinced of the congruence between Buddhism and science could continue the medicalised approach and perhaps, as Baer suggested, develop new ontological and epistemological ways of accessing non-scientific concepts. What becomes clearer in this decade is the major obstacles to seeking scientific validation for many mindfulness interventions were built into the paradigm and maintained.

A key conclusion from this chapter is that despite the progress made by Shapiro and others, their study demonstrated many of the same generalisations seen in Kabat-Zinn's claims.

For example, the view that Buddhism was one integrated knowledge system and that spiritual thought and practice could be approached from a scientific perspective without ontological considerations. These suppositions may reflect a systemic problem, perhaps incommensurability, limiting scientific knowledge of the cognitive elements contained in traditional meditation practices. The attempts by scientists to establish operational theoretical frameworks signposted greater scientific accessibility without significantly influencing the scientific output. The wider picture of mindfulness research at the end of the decade was continued horizontal growth, with new MBIs being developed for new settings, generally offering promising but unproven claims. Strategic reviews continued to flag the same problems first identified in medicalised meditation by West in 1979. In 2010, the widely evidenced limitations in mindfulness research did not pause the mindfulness revolution. Whatever the engine propelling mindfulness forward was, this decade has demonstrated it was not solely linked to medicine, science or Buddhism.

Chapter 7: The Mindfulness Revolution, 2011 to 2020

1. Introduction

In this decade, the impressive year-on-year growth in published scientific studies linked to mindfulness continued. (Figure 16) The Scopus database holds 414 entries published in 2011 with 'mindfulness' in the title, abstract or keywords; by 2020, the total was 3016, a five-fold increase. Over 16,000 'mindfulness' entries are indexed for this decade. However, the number of peer-reviewed journal articles only tells part of the scientific history.

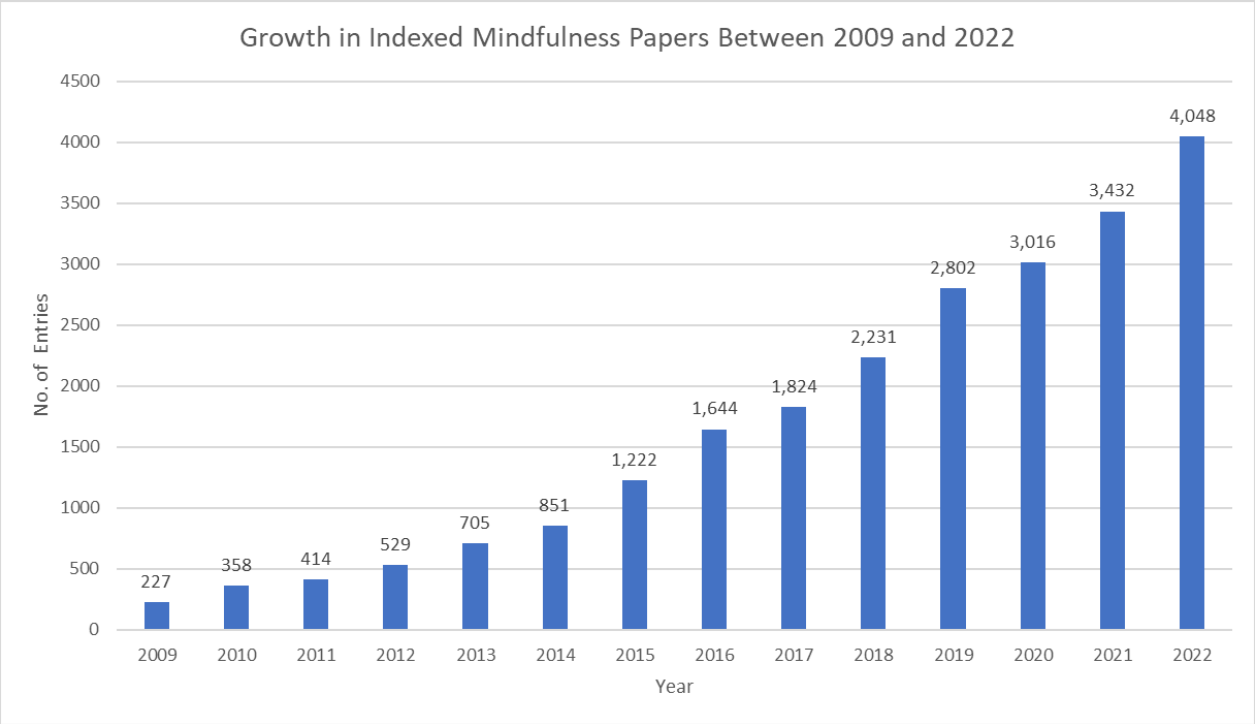

Fig. 16 The total number of entries in the Scopus database with the term 'mindfulness' in the abstract, title, or keywords indexed between 2009 and 2022.[1]

[1] Elsevier, Document Search 'mindfulness', Scopus, 2023, <https://www.scopus.com> [accessed 29 October 2023].

The enthusiasm for the mindfulness concept was still clearly visible at the start of the decade, particularly in the USA and UK. The media reported more promising applications in many different disciplines, and in 2011, mindfulness advocates were describing the benefits of the practice with new authority.[2] The status of mindfulness was pushed even higher when British politicians added their voices to the clamour for increased deployment of mindfulness in the UK.[3] In 2014, the UK's MAPPG endorsed widespread engagement of the technique and advocated for increased therapeutic use, particularly of MBCT.[4] The vast majority of published mindfulness studies offered positive claims to an increasingly convinced public, although the same concerns about experimental limitations in meditation research first made in the 1970s continued. In a highly critical review in 2011, Paul Grossman challenged the rationale for the self-reported mindfulness scales on which many experimental findings had become dependent:

> This paper addresses a number of intractable issues regarding these scales, in general, and also specifically highlights vulnerabilities of the adult and adolescent forms of the Mindfulness Attention Awareness Scale. These problems include (a) lack of available external referents for determining the construct validity of these inventories, (b) inadequacy of content validity of measures, (c) lack of evidence that self-reports of mindfulness competencies correspond to actual behavior and evidence that they do not, (d) lack of convergent validity among different mindfulness scales, (e) inequivalence of semantic item interpretation among different groups, (f) response biases related to degree of experience with mindfulness practice, (g) conflation of perceived mindfulness competencies with valuations of importance or meaningfulness, and (h) inappropriateness of samples employed to validate questionnaires.[5]

[2] Barry Boyce, *The Mindfulness Revolution: Leading Psychologists, Scientists, Artists, and Meditation Teachers on the Power of Mindfulness in Daily Life* (Shambhala Publications, 2011).
[3] House of Lords.
[4] MAPPG.
[5] Paul Grossman, 'Defining Mindfulness by How Poorly I Think I Pay Attention during Everyday Awareness and Other Intractable Problems for Psychology's (Re)Invention of Mindfulness: Comment on Brown et al. (2011)', *Psychological Assessment*, 23.4 (2011), 1034–40 <https://doi.org/10.1037/a0022713>. p. 1034.

In the paper, Grossman not only challenged the self-reported methodologies on which the mindfulness paradigm was created, he also suggested the presence of an ontological conflict:

> It seems likely that many Western psychologists may have little frame of reference and consequently may respond with a degree of incredulousness toward this introspective approach, especially given the claims that years are needed merely to begin to master it and that processes are cast together in fully unfamiliar ways.[6]

Grossman's claims were challenging but not controversial; scientists had discussed the limitations of self-reported measures in the mindfulness literature since 1982. As seen in the previous chapter, in 2003, Kabat-Zinn questioned the ability of science (scientists) to evaluate the benefits of mindfulness. However, at the decade's start, scientific concerns were drowned out by wave after wave of scientific and public enthusiasm built on exciting claims emerging from preliminary research.

There was no observable change in society or science creation to account for the growing scientific and social policy support for mindfulness. From a historical perspective, the endorsement of MBCT by NICE in 2004 dramatically increased interest in research and practice. However, the claims that mindfulness was a low-cost panacea sustained continued growth after 2010. This enthusiasm for mindfulness suggests an uncoupling of strategic scientific reviews and elements of the promotion and consumption of mindfulness in society had occurred. With many studies distributing preliminary findings confidently, it is unsurprising that politicians also became caught up in the hype.[7] There are signs of an idealistic element in MAPPG's policy statement *Mindful Nation*.[8] However, in the same report,

[6] Grossman. p. 1039.
[7] This is a direct reference to the title of a critical study published by Van Dam and others in 2018; see: Van Dam and others.
[8] MAPPG.

mindfulness was also positioned as a foundation for the UK's future economic prospects. And in the middle years of this decade it was claimed by some politicians and scientists that mindfulness might be the solution to many of society's most intractable problems. Politicians and social policy agents were transitioning Mindfulness from a spiritual practice to a tool to maintain the economic status quo in the UK.

The proliferation of the concept was remarkable. Although the primary focus of this thesis is the use of mindfulness as a health and wellbeing intervention, its growing popularity was supported by claimed benefits in many other unrelated fields. In particular, the potential of mindfulness in occupational and educational settings was gaining traction. For example, In 2011, Theresa Glomb and others contributed a chapter, 'Mindfulness at Work', to a business-oriented academic book *Research in Personnel and Human Resources Management*.[9] They contended that mindfulness might have a beneficial role in the workplace: 'In this chapter, we argue that state and trait mindfulness and mindfulness-based practices in the workplace should enhance employee outcomes.'[10] Also in 2011, Siobhan Lynch and others published a pilot study launching a new MBI targeting university populations:

> The aim of this study was to explore the feasibility of implementing a new 8-week mindfulness-based programme, 'Mindfulness-Based Coping with University Life' (MBCUL), specifically tailored to the needs and demand of students and to explore its impact in a pilot evaluation.[11]

Alongside increased neuroscientific engagement with mindfulness, other technological innovations appeared in the literature after 2010. The use of digital platforms, including apps,

[9] Theresa M. Glomb and others, 'Mindfulness at Work', in *Research in Personnel and Human Resources Management*, ed. by Aparna Joshi, Hui Liao, and Joseph J. Martocchio, Research in Personnel and Human Resources Management (Emerald Group Publishing Limited, 2011), XXX, 115–57 <https://doi.org/10.1108/S0742-7301(2011)0000030005>.
[10] Glomb and others. p. 115.
[11] Siobhan Lynch and others, 'Mindfulness-Based Coping with University Life: A Non-Randomized Wait-List-Controlled Pilot Evaluation', *Stress and Health*, 27.5 (2011), 365–75 <https://doi.org/10.1002/smi.1382>. p.365.

to deliver mindfulness training was one of the most prominent.[12] However, the clinical potential of mindfulness continued to dominate the research agenda, generating significant support from agents of health policy and health care such as the NHS.

As the body of research grew, Kabat-Zinn's direct influence on the scientific trajectory of mindfulness declined, but he continued to maintain the theoretical link between MBSR and Buddhism. However, when Buddhism was mentioned in a meaningful scientific context, it was often used by critics to challenge Kabat-Zinn's claims about the relationship between Buddhism, science, and mindfulness.[13] In their 2011 review, 'Effects of Mindfulness on Psychological Health: A Review of Empirical Studies' Shian-Ling Keng and others argued that medicalised mindfulness was a departure from belief-based practices: 'As the idea and practice of mindfulness has been introduced into Western psychology and medicine, it is not surprising that differences emerge with regard to how mindfulness is conceptualized within Buddhist and Western perspectives.'[14] Understanding how MBSR might be linked to traditional practices remained a live issue, and there was no authoritative scientific explanation of what mindfulness was and how it worked. Kabat-Zinn appears to have reacted to challenges to his bridging hypothesis by doubling down on his claims about the Buddhist nature of MBSR.[15] In a paper published in 2013 in the peer-reviewed *Contemporary Buddhism* journal, Kabat-Zinn argued for the inseparability of MBSR, MBIs and Buddhism:

> This all is to say that it can be hugely helpful to have a strong personal grounding in the Buddhadharma and its teachings, as suggested in the earlier sections. In fact, it is

[12] Kate Cavanagh and others, 'A Randomised Controlled Trial of a Brief Online Mindfulness-Based Intervention', *Behaviour Research and Therapy*, 51.9 (2013), 573–78 <https://doi.org/10.1016/j.brat.2013.06.003>.
[13] Shian-Ling Keng, Moria J. Smoski, and Clive J. Robins, 'Effects of Mindfulness on Psychological Health: A Review of Empirical Studies', *Clinical Psychology Review*, 31.6 (2011), 1–34 <https://doi.org/10.1016/j.cpr.2011.04.006>.
[14] Keng, Smoski, and Robins. p. 2.
[15] Kabat-Zinn, 'Some Reflections on the Origins of MBSR, Skillful Means, and the Trouble with Maps'. p. 288.

> virtually essential and indispensable for teachers of MBSR and other mindfulness-based interventions.[16]

Typically, for Kabat-Zinn's accounts, there was no systematic attempt to demonstrate what this statement meant to the scientific understanding of MBSR.

It seems likely that scientific endorsements spurred enthusiasm for the concept across society. However, as will be discussed in later sections, the media and politicians' uncritical acceptance of initial claims for mindfulness practice may have also contributed to the intervention's popularity, particularly in the UK. In 2011, leading mindfulness advocates announced the arrival of a *Mindfulness Revolution* in a book published by Shambhala Publications. Shambala is an organisation specialising in the publication of Buddhist-related materials.[17] The *Mindfulness Revolution* described an interdisciplinary and transdisciplinary phenomenon, embracing science, humanities, religion and the arts.[18] In the UK, the claimed potential of mindfulness as a tool of social and health policy led to its increasing acceptance at all levels of society.

Although positive claims for mindfulness's benefits dominated the scientific narrative in this decade, criticism of mindfulness research also grew, reaching a crisis point towards the end of the decade. Several of the conceptual strands described in previous chapters culminated after 2017. Firstly, the influence of medicalised mindfulness as a contrast to traditional scientific values became harder to accept as an authoritative explanation of how mindfulness brought widespread benefits failed to emerge. Without a stable theoretical framework, experiments lacked proof that mindfulness training mediated health and wellbeing. The promising but unproven characterisation of mindfulness was seen less as optimistic and

[16] Kabat-Zinn, 'Some Reflections on the Origins of MBSR, Skillful Means, and the Trouble with Maps'.
[17] Boyce.
[18] Boyce.

increasingly unscientific during the decade, and the consequences of positive claims from preliminary research received significant pushback in some quarters. This conflict played out in the repeated criticism of positive preliminary mindfulness studies by strategic research reviews unseen or ignored by many advocates of the intervention.

The main problem in mindfulness research during this decade remained the pragmatic approach adopted for MBSR by Kabat-Zinn in 1979. For example, in their 2011 review of mindfulness studies, Keng and others made exciting claims about mindfulness: 'We conclude that mindfulness brings about various positive psychological effects, including increased subjective wellbeing, reduced psychological symptoms and emotional reactivity, and improved behavioural regulation.'[19] However, they were less certain exactly how mindfulness worked: 'Little is yet known regarding for whom and under what conditions mindfulness training is most effective, but there is some preliminary evidence to suggest that its effectiveness may vary as a function of individual differences.'[20]

As described in the previous chapters, maintaining two opposing views of mindfulness research inevitably led to a paradox. If peer-reviewed literature reports scientific investigations as both reliable and unreliable, uncertainty is inevitable, and the authority of science can be undermined. There were signs of growing restlessness among mindfulness scientists as the decade progressed. Sona Dimidjian and Zindel Segal (of MBCT) suggested ways of bringing MBIs into a more robust scientific framework in their 2015 study 'Prospects for a Clinical Science of Mindfulness-Based Intervention': 'We contend, however, that the public health impact of MBIs can be enhanced significantly by situating this work in a broader framework of clinical psychological science.[21] However, scientists still committed to the MBSR medicalised trajectory, such as Richard Davidson and Alfred Kaszniak, used the low quality of

[19] Keng, Smoski, and Robins. p. 1.
[20] Keng, Smoski, and Robins. p. 15.
[21] Sona Dimidjian and Zindel V. Segal, 'Prospects for a Clinical Science of Mindfulness-Based Intervention', *American Psychologist*, 70 (2015), 593–620 <https://doi.org/10.1037/a0039589>.

psychological research more generally to mitigate the methodological problems in mindfulness research.[22] Also, in their 2015 paper 'Conceptual and Methodological Issues in Research on Mindfulness and Meditation', they argued that more, better quality research could improve the reliability of MBIs:

> It is important to underscore the fact that research in this area is still in its infancy though good progress has been made over the past decade. We believe that the quality of research in this area will improve now that more sophisticated designs have recently been published.[23]

Davidson and Kasniak were right; there had been some improvements in mindfulness research. However, they missed the point about the length of scientific engagement in the contemplative sciences. Meditation has been researched since the 1930s; it was not a new enterprise. The influential study by Kasamatsu and Hirai from 1966, the 'Science of Zazen', employed a methodology more robust than many studies used in the 21st Century.[24] There is a case to be made that the movement away from objective experimental data to self-reported psychometric data, reflected in the MBSR paradigm, saw the quality of meditation research decline over time. In addition, the 2000 MBCT experiments were recognised as a methodological breakthrough that propelled mindfulness into the scientific mainstream. The two main questions dividing the mindfulness scientific community in 2015 were not how to improve the research quality but why the same methodological limitations had been repeated since the late 1970s. Secondly were positive findings from preliminary experiments overstated in the scientific literature and, subsequently, in the media. The paradox led to a crisis in

[22] Richard J. Davidson and Alfred W. Kaszniak, 'Conceptual and Methodological Issues in Research on Mindfulness and Meditation', *The American Psychologist*, 70.7 (2015), 581–92 <https://doi.org/10.1037/a0039512>.
[23] Richard J. Davidson and Kaszniak, 'Conceptual and Methodological Issues in Research on Mindfulness and Meditation'. p. 31.
[24] Kasamatsu and Hirai, 'Science of Zazen'.

mindfulness research in 2018 when Van Dam and 14 co-authors claimed in their critical research review MtH that hyping early-stage research could misinform or harm consumers.[25] This review provided the strongest challenge to the medicalised approach and would be much harder to ignore than the dozens of earlier critical reviews published since 2002. Mindfulness studies were so numerous that by 2020, almost every area of psychology had contributed a sub-set of work to the mindfulness conversation, and peer-reviewed MBI papers appeared in multiple scholarly and scientific disciplines.

The rationale of this chapter follows that used in Chapter 6, focusing on large-scale reviews and case studies of the most influential and widely cited peer-reviewed papers supported by other relevant sources. Section 2 establishes the wider context influencing the trajectory of mindfulness, focussing on the concept of the mindfulness revolution. Section 3 discusses the role of neuroscience in mindfulness's development, drawing primarily on the influential review, 'The Neuroscience of Mindfulness Meditation' by Tang and others. The growing role of social policy in promoting mindfulness is the focus of Section 4. Section 5 describes a rising tide of critical concern within the scientific community. The potential of mindfulness to produce UAEs in patients, largely ignored before this decade, is discussed in Section 6. The chapter's conclusions are presented in Section 7.

2. The Mindfulness Revolution and the Search for Scientific Clarity

The *Mindfulness Revolution* is a good place to start a brief analysis of the location of mindfulness research and practice at the start of the decade.[26] From our current vantage point, where mindfulness has received significant critical attention, it is hard to appreciate the

[25] Van Dam and others.
[26] Boyce.

enthusiasm surrounding the perceived potential of MBIs in 2011. *The Mindfulness Revolution* was an edited collection of essays with over forty contributors, from scientists to spiritual teachers; the breadth of the issues tackled in the book is spectacular. The reader is encouraged to think that parenting, art, finance, photography, ageing and much more could be enhanced by taking a mindful perspective. As an enthusiastic celebration, this is a powerful statement of the conviction of mindfulness advocates. In reality, it was not a realistic evaluation of what was known and could have been proven about Western or Buddhist forms of mindfulness. Many of the benefits described in this account were speculative, aspirational or over-generalised. For example, in the Introduction, Barry Boyce claimed of mindfulness: 'It helps us in our home life, with our family, our friends, and our colleagues. It helps us with our businesses, our volunteer groups, our churches, our communities, and in our societies at large.'[27] In the early years of this decade, there was a belief that mindfulness could be a force for positive change in many areas of society. However, this book was not a scholarly journal, but scientists contributed to it. And later in this chapter, we will see more overarching claims for mindfulness appearing in social policy discourses.[28] Many business people also became mindfulness advocates. Erik Dane's 2011 paper considered the role of mindfulness in improving task performance. [29] Articles frequently appeared in the business media extolling the benefits of mindfulness on corporate performance.[30] This relocated Buddhist practice even attracted the interest of the military, a 2014 study by Douglas Johnson and others argued that mindfulness could boost the resilience of US Marines about to be deployed.[31]

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[27] Boyce. p. xviii
[28] 'House of Lords'.
[29] Erik Dane, 'Paying Attention to Mindfulness and Its Effects on Task Performance in the Workplace', *Journal of Management*, 37.4 (2011), 997–1018 <https://doi.org/10.1177/0149206310367948>.
[30] Kimberly Schaufenbuel, 'Why Google, Target, and General Mills Are Investing in Mindfulness', *Harvard Business Review*, 28 December 2015 <https://hbr.org/2015/12/why-google-target-and-general-mills-are-investing-in-mindfulness> [accessed 28 December 2022].
[31] Douglas C. Johnson and others, 'Modifying Resilience Mechanisms in At-Risk Individuals: A Controlled Study of Mindfulness Training in Marines Preparing for Deployment', *American Journal of Psychiatry*, 171.8 (2014), 844–53 <https://doi.org/10.1176/appi.ajp.2014.13040502>.

A powerful mindfulness stakeholder alliance had been formed in the first half of the decade. The media, health and social policy, corporations, spiritual leaders, and even the military endorse the value of the concept of mindfulness. In the face of so many vested interests, the importance of scientific investigations to offer reliable guidance became crucial. The number of optimistic preliminary studies continued growing, as did critical meta-studies and reviews. Mindfulness's proliferation was largely on preliminary studies, spawning more preliminary studies.

When the Min*dfulness Revolution* was published, there were many signs of mindfulness's benefits but few causal explanations. Most meditation scientists followed Kabat-Zinn's mindfulness trajectory and not the path to more robust scientific validation epitomised by the MBCT project.[32] The enthusiastic reception of early-stage research, possibly encouraged the reluctance among scientists to carry out the complex theoretical studies and RCTs that would have increased the evidence supporting or rejecting early-stage mindfulness research. The lack of authoritative theoretical frameworks made in-depth mindfulness research problematic and uncertain. In every instance, the alignment of mindfulness with military and corporate ambitions in this decade probably confirmed its role as a mind-training method and not, as was claimed, a bridge between Buddhism and science. The significance of 'intention', 'compassion' and 'ethics' discussed in Chapter 1 and Chapter 6, missing from the original MBSR paradigm, now becomes clearer. From a scientific point of view, if Kabat-Zinn's version of mindfulness was not the integration of Buddhist and scientific knowledge, what was it, and how could a stable theoretical framework be established?

As described in Chapter 6, mindfulness refers to at least three separate elements, none of which had been scientifically established in 2011; mindfulness meditation is the training used to initiate the mindfulness mental process, which could mediate state or trait mindfulness

[32] Teasdale and others.

in the patient or participant.[33] When Kabat-Zinn published his retrospective review of the development of MBSR in 2011, 'Some Reflections on the Origins of MBSR, Skillful Means, and the Trouble with Maps', the problems underpinning mindfulness's lack of a theoretical framework became much clearer.[34] Writing for the Buddhist studies community, he revealed how disconnected MBSR had been from a sound scientific understanding at its foundation. Kabat-Zinn appears to be saying he had no real idea how mindfulness worked: 'It always felt that the details concerning the use of the word mindfulness in the various contexts in which we were deploying it could be worked out later by scholars and researchers who were knowledgeable in this area.'[35] However, this appears to be wishful thinking as Kabat-Zinn had developed MBSR through an unknown process of relocation, which was not described in the scientific literature. He was, in effect, suggesting that defining and thus scientifically proving the mindfulness concept was the responsibility of others without sharing essential information. Kabat-Zinn chose to establish mindfulness, largely ignoring the question of how it worked. Scientists following the medicalised mindfulness paradigm would inevitably focus on clinical benefits, not causal explanations. Major scientific progress in understanding MBSR or MBIs would require deviation from or elaboration of the work of Kabat-Zinn and others.

The lack of a stable framework within which MBSR could be reliably evaluated allowed a theoretical free-for-all to develop. Some scientists conceived mindfulness and the operationalisation of the training method differently. In 2010, Alberto Chiesa and Alessandro Serretti published a meta-study in the *Psychological Medicine* journal, arguing that mindfulness research was promising but unproven, concluding that: 'Despite encouraging findings, several limitations affect current studies.'[36] However, a letter in reply to this article by Mathew

[33] For more details see Keng, Smoski, and Robins.
[34] Kabat-Zinn, 'Some Reflections on the Origins of MBSR, Skillful Means, and the Trouble with Maps'.
[35] Kabat-Zinn, 'Some Reflections on the Origins of MBSR, Skillful Means, and the Trouble with Maps'. p. 290.
[36] Alberto Chiesa and Alessandro Serretti, 'A Systematic Review of Neurobiological and Clinical Features of Mindfulness Meditations', *Psychological Medicine*, 40.8 (2010), 1239–52 <https://doi.org/10.1017/S0033291709991747>.

Brensilver, published the following year, signposted how confusion over definitions of mindfulness may have been compounded:

> In the efforts to make mindfulness a respectable object of empirical investigation and denude it of its religious baggage, researchers have alternatively added different meanings under the umbrella of 'mindfulness' while simultaneously removing mindfulness from its context, thus presenting a reductionistic vision of how benefits may accrue.[37]

In their reply to Brensilver, published in the same journal, Chiesa and Serretti also argued that a failure to operationalise mindfulness meditation (MM) in its original forms led to fragmentation rather than consistency in scientific understanding:

> Chiesa & Malinowski (in press) summarize such issues recognizing that, although at first glance it appears as if a large body of research converges on understanding the effects of mindfulness practice as a unitary phenomenon, the closer inspection of the philosophical background, aims and practices of classical MM and modern MBI reveals a large diversity that may question the usefulness of using mindfulness as umbrella term for this rich diversity. [38]

Collectively, these claims argue that medicalised mindfulness was not Buddhist and reflected an unknown number of ideas, interpretations, and concepts.

Brensilver started to move forward with the conversation about the relationship between Buddhist mindfulness and MBSR. His comments also highlight the frame of reference typically used in psychology to describe Buddhism and traditional forms of mindfulness.[39] With rare exceptions, such as the work of Eleanor Rosch, Western academics attempted to understand Buddhist meditation without referencing the ontological foundations of different

[37] Matthew Brensilver, 'Letter to the Editor: Response to "A Systematic Review of Neurobiological and Clinical Features of Mindfulness Meditations"', *Psychological Medicine*, 41.3 (2011), 666–68 <https://doi.org/10.1017/S003329171000245X>. p. 666.
[38] Brensilver. p. 667
[39] Brensilver. p. 667

Buddhist schools.[40] These observations are relevant because unevidenced claims about Buddhism have been central to the continued scientific trajectory and limitations of medicalised mindfulness research and practice.

The theoretical confusion appears to have grown throughout this decade and was explored in more detail by Håkan Nilsson and Ali Kazemi in 2016, who, in their peer-reviewed paper 'Reconciling and Thematizing Definitions of Mindfulness: The Big Five of Mindfulness', quantified distinct conceptualisations of mindfulness in a sample of peer-reviewed research:

> 'In the present article 33 definitions of mindfulness were extracted from a pool of 308 peer-reviewed full-length theoretical or empirical articles written in English, published between 1993 and March 2016, after systematic searches in Google Scholar, PsycARTICLES, and SocINDEX.'[41]

Nilsson and Kazemi's analysis identified more than one definition of mindfulness for every ten papers investigated. In addition, disciplinary-specific methodological approaches made common understandings of mindfulness even more difficult.

Undoubtedly, more reliable methodologies would have improved the quality of mindfulness research, but the greatest challenge was to create stable theoretical frameworks. From such understandings, the mechanism of mindfulness could be established, leading to testable hypotheses which could have provided scientific evidence of the clinical benefits (or not) of mindfulness training. Previous attempts to develop mechanisms of mindfulness by Shapiro and others, discussed in Chapter 6, were still a work in progress.[42] In 2017, Shapiro

[40] Eleanor Rosch, 'More Than Mindfulness: When You Have a Tiger by the Tail, Let It Eat You', *Psychological Inquiry*, 18.4 (2007), 258–64 <https://doi.org/10.1080/10478400701598371>.
[41] Nilsson and Kazemi. p. 183.
[42] Shapiro and others.

and Linda Carlson were speculating about how the mechanisms of mindfulness might best be understood.[43]

While enthusiasm for the mindfulness revolution appears to have been encouraged by positive preliminary studies and no small amount of optimism, there were obvious dangers in overhyping claims for the benefits of early-stage unreplicated findings. In 2017, David Cresswell, a psychologist at Carnegie Mellon University, reviewed the state of mindfulness research in the 'Annual Review of Psychology.[44] Cresswell warned that 'some fanaticism' rather than reliable science was used to establish mindfulness in schools and the workplace:

> There are certainly many contexts in which public interest in the benefits of mindfulness interventions has resulted in some fanaticism and characterization of mindfulness training as a panacea treatment. For example, mindfulness interventions are being integrated into schools and the workplace in the absence of a corpus of high-quality well-controlled RCT studies.[45]

As will be described in Section 5, 2018 saw the publication of a particularly hard-hitting review of mindfulness research, MtH, which made damning claims about promoting preliminary research as scientifically validated. In this decade, mindfulness went through a period of dramatic, uncontrolled growth, a revolution where non-scientific forces influenced the conduct and interpretation of science. While critical mindfulness studies received little attention in the early part of the decade, they became increasingly influential.

[43] Shapiro and Carlson.
[44] J. David Creswell, 'Mindfulness Interventions', *Annual Review of Psychology*, 68.1 (2017), 491–516 <https://doi.org/10.1146/annurev-psych-042716-051139>.
[45] Creswell, 'Mindfulness Interventions'. p. 509.

3. The Neuroscience of Mindfulness After 2010

As described in Chapter 2, Walter's earliest scientific study recording the effects of meditation on the brain was an EEG investigation published in 1938.[46] Between 1982 and 2010, neuroscience was a small element of mindfulness research; the Scopus database records 69 entries for this period with mindfulness in the title, abstract, or keywords and the subject area defined as neuroscience.[47] The figure between 2011 and 2020 was 1165 entries; however, this represented less than 10 per cent of the total number of mindfulness studies in the index for this period. Neuroscientific experiments positively impacted mindfulness's reputation, as it is a 'trusted' form of investigation, disproportionately influencing the perception of scientific reasoning.[48] However, while neuroscientific techniques such as Functional Magnetic Resonance Imaging (fMRI) appear to present objective data about brain function and structure, their reliability depends on robust experimental methodologies. In 2009, Craig Bennet and others drew attention to the methodological uncertainty in neuroscience by publishing a study that demonstrated neural activity in a dead salmon.[49] Eight years later, the uncertainty surrounding methodologies used in neuroscience was still unresolved.[50] In a 2017 paper published in *Nature Reviews Neuroscience,* Russell Poldrack produced more evidence of limitations in neuroscience research:

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[46] Walter. p. 373.
[47] Elsevier, Document Search 'mindfulness', Scopus, 2023 <https://www.scopus.com> [accessed 28 October 2023].
[48] Rebecca E. Rhodes, Fernando Rodriguez, and Priti Shah, 'Explaining the Alluring Influence of Neuroscience Information on Scientific Reasoning', *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 40 (2014), 1432–40 <https://doi.org/10.1037/a0036844>.
[49] Craig Bennett, Michael Miller, and George Wolford, 'Neural Correlates of Interspecies Perspective Taking in the Post-Mortem Atlantic Salmon: An Argument for Multiple Comparisons Correction."', *Neuroimage 47,* 47.Suppl 1 S125 (2009).
[50] Russell A. Poldrack and others, 'Scanning the Horizon: Towards Transparent and Reproducible Neuroimaging Research', *Nature Reviews Neuroscience*, 18.2 (2017), 115–26 <https://doi.org/10.1038/nrn.2016.167>. p.115.

> However, concerns have recently been raised that the conclusions that are drawn from some human neuroimaging studies are either spurious or not generalizable. Problems such as low statistical power, flexibility in data analysis, software errors and a lack of direct replication apply to many fields, but perhaps particularly to functional MRI.[51]

Critiques of the reliability of neuroscientific methods confirm, as with mindfulness, conflicts between preliminary studies and the traditional view of the scientific method. However, also, in line with the mindfulness revolution, the neuroscientific revolution relied upon the wider perception of the benefits of the technology rather than just its scientific validation.[52]

Claims made for the benefits of MBSR and MBI were largely built on data obtained from subjective self-reports. The mechanistic approaches of neuroscience could have brought much-needed objective insights to mindfulness research. Worth Boone and Gualtiero Piccinini illustrated the systematic merits of neuroscience in their 2016 paper, 'The Cognitive Neuroscience Revolution': 'Whereas traditional cognitive scientific explanations were supposed to be distinct and autonomous from mechanistic explanations, neurocognitive explanations aim to be mechanistic through and through.'[53]

Early in this decade, neuroscientific experiments suggested that meditators had different or altered brain structures than non-meditators. Still, these findings did not prove that meditation was the causal factor. For example, a study by Nicolás Fayed and others from 2013 found that Zen monks had slightly different brain structures than a control group: 'This study provides evidence of subtle abnormalities in neuronal function in regions of the white matter in meditators.'[54] The problem was that many behaviours could cause such differences, not just

[51] Poldrack and others. p. 115.
[52] The presence of a neuroscience revolution, and its significance is described by Worth Boone and Gualtiero Piccinini, 'The Cognitive Neuroscience Revolution', *Synthese*, 193.5 (2016), 1509–34 <https://doi.org/10.1007/s11229-015-0783-4>.
[53] Boone and Piccinini.
[54] Nicolás Fayed and others, 'Brain Changes in Long-Term Zen Meditators Using Proton Magnetic Resonance Spectroscopy and Diffusion Tensor Imaging: A Controlled Study', *PLOS ONE*, 8.3 (2013), e58476 <https://doi.org/10.1371/journal.pone.0058476>.

meditation. Other aspects of a monastic or ordained lifestyle, such as diet, might lead to a difference in brain anatomy. Even with the support of neuroscientific studies, the thorny issue of causality, the link between mindfulness training and its health benefits was rarely scientifically demonstrated. An extra experimental step would be necessary to establish a connection between mindfulness and the observed changes in brain structure and functions.

In 2014, Kieran Fox and other neuroscientists argued in a journal article investigating the potential of meditation that to make progress in this field, an understanding of the relationship between changing brain structures (morphometric analyses), brain functions seen through neuroimaging studies, and meditation practices had to be established.[55] The scientists explained that the challenge for neuroscience was to show that the cognitive processes of mindfulness led to brain changes: 'Integrate morphometric analyses with concurrent behavioural measures and functional neuroimaging to begin to establish the functional relevance of morphological differences'.[56] In 2015, Antoine Lutz and others took the idea further by proposing a new approach combining behavioural and neuroscientific insights: 'This phenomenological matrix of mindfulness is presented as a heuristic to guide formulation of next-generation research hypotheses from both cognitive/behavioral and neuroscientific perspectives.'[57]

Despite limitations, the contribution of neuroscience strengthened scientific endorsements for the potential of mindfulness. In their 2015 review, 'The Neuroscience of Mindfulness Meditation', Yi-Yuan Tang and others summarised progress in this field.[58] They

[55] Kieran C. R. Fox and others, 'Is Meditation Associated with Altered Brain Structure? A Systematic Review and Meta-Analysis of Morphometric Neuroimaging in Meditation Practitioners', *Neuroscience & Biobehavioral Reviews*, 43 (2014), 48–73 <https://doi.org/10.1016/j.neubiorev.2014.03.016>.
[56] Fox and others.
[57] Antoine Lutz, Amishi P. Jha, and others, 'Investigating the Phenomenological Matrix of Mindfulness-Related Practices from a Neurocognitive Perspective', *American Psychologist*, 70 (2015), 632–58 <https://doi.org/10.1037/a0039585>.
[58] Yi-Yuan Tang, Britta K. Hölzel, and Michael I. Posner, 'The Neuroscience of Mindfulness Meditation', *Nature Reviews Neuroscience*, 16.4 (2015), 1–13 <https://doi.org/10.1038/nrn3916>. pp. 215- 217.

claimed that practising mindfulness likely led to changes in brain structures, an increase in grey matter (cell bodies), white matter (nerve fibres), and overall cortical thickness (there are correlations between increased thickness and improved cognition and brain health).[59] Tang and others also summarised the brain regions involved in mindfulness practice, suggesting links to discrete cognitive processes, in particular, attention control, emotion regulation and self-awareness. (Figure 17) Scientists had been hypothesising about these mechanisms of mindfulness for many years, so these findings partly confirmed earlier claims.

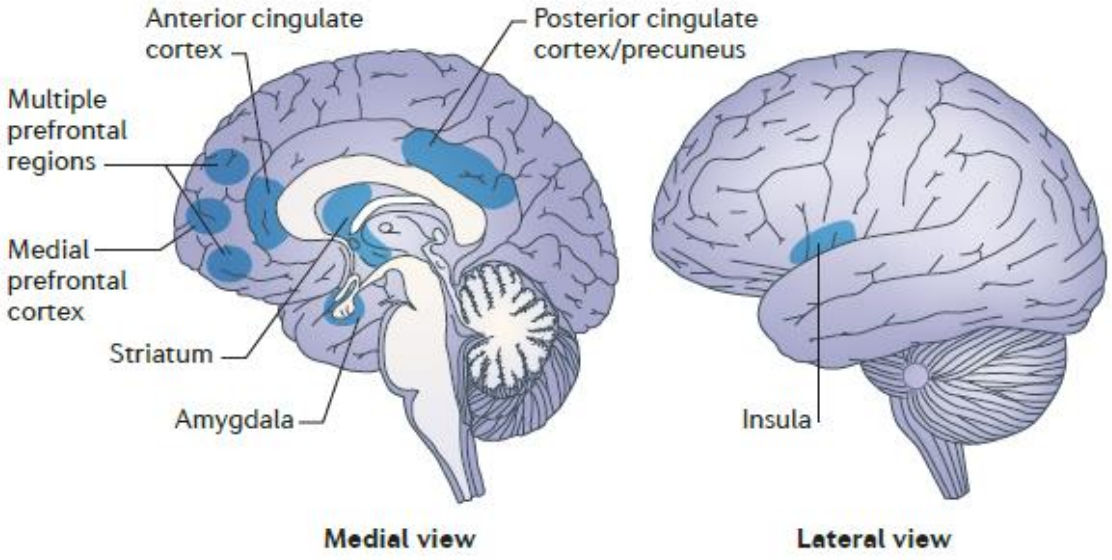

Figure 1 | **Brain regions involved in the components of mindfulness meditation.** Schematic view of some of the brain regions involved in attention control (the anterior cingulate cortex and the striatum), emotion regulation (multiple prefrontal regions, limbic regions and the striatum) and self-awareness (the insula, medial prefrontal cortex and posterior cingulate cortex and precuneus).

Fig. 17. Figure 1 from the 2015 review by Tang and others illustrates the presumed neurobiology of mindfulness.[60]

[59] For a more detailed explanation, see Sophia Frangou and others, 'Cortical Thickness across the Lifespan: Data from 17,075 Healthy Individuals Aged 3–90 Years', *Human Brain Mapping*, 43.1 (2022), 431–51 <https://doi.org/10.1002/hbm.25364>.
[60] Tang, Hölzel, and Posner. p. 217.

For example, mindfulness was originally described as a form of attentional control. The review by Tang and others highlighted some neurobiology to support this claim: 'In the early stages of meditation training, achieving the meditation state seems to involve the use of attentional control and mental effort; thus, areas of the lateral prefrontal and parietal cortex are more active than before training.'[61]

The review by Tang and others was generally positive, illustrated by a summary in the article's abstract: 'Research over the past two decades broadly supports the claim that mindfulness meditation — practised widely for the reduction of stress and promotion of health — exerts beneficial effects on physical and mental health and cognitive performance.'[62] However, there is a contrast between this endorsement and criticisms of research in the article's main body. The review challenged some aspects of the neuroscientific research of meditation: 'The methodological quality of many meditation research studies is still relatively low. Few are actively controlled longitudinal studies, and sample sizes are small.'[63] Despite the technology-led methodology of neuroscience, the 'promising but not proven' characterisation remained, suggesting the mindfulness paradox was also present in this field.

The review by Tang and others also added new uncertainties in evaluating mindfulness research, such as the objectivity of scientist-practitioners (see Chapter 3): 'Although their insider perspective may be valuable for a deep understanding of meditation, these researchers must ensure that they take a critical view of study outcomes.'[64] Fox and others also raised the problem of publication bias in meditation research. This bias indicates an absence of unfavourable results in peer-reviewed journals: 'However, the lack of publication of almost any negative results in morphometric neuroimaging of meditation to date suggests a fair degree

[61] Tang, Hölzel, and Posner. p. 218.
[62] Tang, Hölzel, and Posner. p. 213.
[63] Tang, Hölzel, and Posner. p. 213.
[64] Tang, Hölzel, and Posner. p. 213.

of publication bias, and indicates a strong chance of there being a 'file-drawer problem' in this literature.' [65] The 'file-drawer problem is the presumption that experiments that do not show a positive effect are not submitted for publication leading to a misrepresentation of scientific output. Finally, Tang and others argued that methodological and conceptual problems in mindfulness research were linked to the immaturity of the scientific project: 'As is typical for a young research field, many experiments are not yet based on elaborated theories, and conclusions are often drawn from post-hoc interpretations.'[66]

4. The Convergence of Preliminary Findings, Media Enthusiasm and Social Policy

The mindfulness revolution became a society-wide phenomenon in the first half of the decade, driven by positive scientific claims, media enthusiasm, and a growing excitement from politicians and agents of health and social policy. In the UK, claims of mindfulness's health benefits were frequently made out of scientific context, such as a review by The Guardian in 2014, which repeated a preliminary experimental finding: 'There is also growing evidence that it's effective for chronic long-term health conditions such as ME.'[67] Also, in 2014, high-profile celebrities and UK politicians joined forces to promote mindfulness.[68] Although politicians came to the mindfulness discussion relatively late compared to other stakeholders, they exerted

[65] The 'file-draw problem' suggest that experiments that did not demonstrate a significant effect were filed by scientists rather than submitted for journal publication. Fox and others. p. 67.
[66] There are several references to 'publication bias' in the meta-study by Fox and others.
[67] David Derbyshire, 'Should We Be Mindful of Mindfulness?', *The Observer*, 23 February 2014, section Society <https://www.theguardian.com/society/2014/feb/23/should-we-be-mindful-of-mindfulness-nhs-depression> [accessed 31 December 2022].
[68] Robert Booth, 'Politicians Joined by Ruby Wax as Parliament Pauses for Meditation', *The Guardian*, 7 May 2014, section Society <https://www.theguardian.com/society/2014/may/07/politicians-ruby-wax-parliament-mindfulness-meditation> [accessed 31 December 2022].

significant influence, even advocating for a national mindfulness strategy. Hansard records a glowing testimony by Lord Stone of Blackheath in 2014:

> Her Majesty's Government, in considering our approach to the role of government in addressing the need to invigorate the economy, sustain the environment and create a civil society, may wish to help us develop a strategy for mindfulness across several areas of society where scientific proof of its beneficial effects is already on record. Drawing all this together in a cohesive plan could engender widespread wellbeing and stimulate the economy at the same time.[69]

We can see a shift reflected in Lord Stone's comments: the repositioning of mindfulness as a tool for economic, environmental and civil change as well as a wellbeing intervention. The implications of the mindfulness paradox for the wider society are also visible here. There was little replicated scientific evidence to support the wide-ranging claims made for mindfulness. However, if scientists could not agree on which MBIs were scientifically validated, then almost inevitably, the public discourse about the scientific status of the intervention would be uncertain.

All Party Parliamentary Groups (APPG) are informal alliances of UK politicians from across the political spectrum who come together to pursue issues of their collective interest. APPGs are described on the UK Parliament website: 'They are essentially run by and for Members of the Commons and Lords, although many groups involve individuals and organisations from outside Parliament in their administration and activities.'[70] Lord Stone was a member of the Mindfulness APPG (MAPPG), which became an influential advocate for the wider proliferation of mindfulness after the group was formed in 2014.[71] The Mindfulness

[69] 'House of Lords'.
[70] 'All-Party Parliamentary Groups' <https://www.parliament.uk/about/mps-and-lords/members/apg/> [accessed 1 July 2023].
[71] MAPPG.

Initiative provided the secretariat for the MAPPG. Their partners and advisors include leading mindfulness institutions and scientists:

> The Mindfulness Initiative was founded by Madeleine Bunting and Chris Cullen in November 2013 to support British politicians in forming the All-Party Parliamentary Group on Mindfulness. Our partners include the four mindfulness training and research centres in Bangor, Exeter, Oxford and Sussex universities, as well as the Mental Health Foundation, Mindfulness Association and Breathworks, and we benefit from an advisory group comprising some of the most experienced mindfulness scientists and practitioners in the UK and around the world.[72]

In 2015, the MAPPG published *Mindful Nation,* which is not to be confused with *A Mindful Nation*, a 2012 self-help guide published by Tim Ryan, an American congressman.[73] *Mindful Nation* described the widespread benefits of mindfulness in education, health, the criminal justice system and the workplace.[74] In the Preface of the document, the evidence-gathering process of the report is described in broad terms:

> This report is the culmination of over a year of research and inquiry including eight hearings in Parliament when members of the Mindfulness All-PartyParliamentary Group were able to hear first-hand and question some of those who have experienced the transformational impacts of mindfulness. [75]

However, *Mindful Nation's* tone followed the enthusiastic claims made in *The Mindfulness Revolution* rather than the balanced evaluation presented in meta-studies and strategic reviews published over the previous decade:

> We have been impressed by the quality and range of evidence for the benefits of mindfulness and believe it has the potential to help many people to better

[72] MAPPG Mindfulness All Party Parliamentary Group.
[73] Congressman Tim Ryan, *A Mindful Nation: How a Simple Practice Can Help Us Reduce Stress, Improve Performance, and Recapture the American Spirit* (Hay House, Inc, 2012).
[74] MAPPG.
[75] MAPPG.

> health and flourishing. On a number of issues ranging from improving mental health and boosting productivity and creativity in the economy through to helping people with long-term conditions such as diabetes and obesity, mindfulness appears to have an impact. This is a reason for government to take notice and we urge serious consideration of our report.[76]

Throughout the document, there was an absence of discussion about the limitations of mindfulness research. Critical studies that indicated mindfulness was promising but required methodological and theoretical improvements were largely ignored. For example, the comprehensive 2014 review by Goyal and others, which analysed 47 trials with 3515 participants and found mixed results from mindfulness research, was not mentioned.[77]

Although the MAPGG was enthusiastic about the benefits of MBCT in the prevention of depressive relapse, *Mindful Nation* failed to discuss lingering doubts raised in some MBCT reviews about the wider benefits of the method, such as the concerns of Chiesa and Serretti published in 2010:

> However, methodological shortcomings of reviewed studies, including small sample size, frequent lack of replications and the absence of studies comparing MBCT to control groups designed to distinguish specific from non specific effects of meditation imply the necessity for further research.[78]

It is unsurprising that *Mindful Nation's* approach was very different from that of a scientific review. The agenda of social policy extends far beyond the perspective of a purely empirical enquiry. However, there is evidence in *Mindful Nation* that meditation was being recruited into a much bigger project than improved health and wellbeing. Through a link with the concept of

[76] MAPPG. p. 4.
[77] Madhav Goyal and others, 'Meditation Programs for Psychological Stress and Well-Being: A Systematic Review and Meta-Analysis', *JAMA Internal Medicine*, 174.3 (2014), 357–68 <https://doi.org/10.1001/jamainternmed.2013.13018>. p. 375.
[78] A. Chiesa and A. Serretti, 'P02-336 - Mindfulness Based Cognitive Therapy for Major Depression: A Systematic Review and Meta-Analysis', *European Psychiatry*, 25.S1 (2010), 25 <https://doi.org/10.1016/S0924-9338(10)71035-X>. p. 2.

'mental capital, ' mindfulness was positioned as a foundation of the UK's long-term economic strategy.[79] In the report, the idea of 'mental capital' was described:

> The government's Foresight report developed the concept of mental capital, by which it meant the cognitive and emotional resources that ensured resilience in the face of stress, and the flexibility of mind and learning skills to adapt to a fast-changing employment market and longer working lives.[80]

According to *Mindful Nation,* qualitative research suggested mindfulness could train people for a predicted 'fast-changing employment market'.[81] *Mindful Nation* linked social policy, UK economic performance and the role of mindfulness in schools, concluding: 'This should be of real interest to policymakers given the importance of improving productivity and nurturing creativity and innovation in the UK economy. It is also an argument for why mindfulness has a role to play in the education system.'[82]

As discussed in Chapter 1, meditation has always migrated and adapted. So, it is no surprise that mindfulness might be modified to prepare school children for longer and potentially more stressful working lives. However, a synergy between MBSR, the concept of mental capital, and the teachings of the historical Buddha appeared increasingly unlikely after this point. This particular issue has received very little attention in the literature; that mindfulness could have been recruited to train children to be more resilient and accepting of declining conditions in the workplace. The possible misappropriation and misrepresentation of religious values in mental capital is worthy of greater investigation, which is not possible here.

The point of introducing mental capital is to illustrate the broader context in which the scientific acceptance and endorsement of mindfulness took place and the complex and often

[79] MAPPG. p. 6.
[80] MAPPG. p. 6.
[81] MAPPG. p. 6.
[82] MAPPG. p. 6.

unseen forces that shaped scientific engagement with meditation. The configuration of these relationships appears to mediate the impact of critical reviews. Mindfulness's presumed health, economic and social benefits influenced institutional support for the concept. Perhaps crucially, once established, preliminary scientific claims for the effects of mindfulness bled into non-scientific narratives, including those that could promote and fund medicalised meditation research and practice. In the middle years of this decade, there was a visible interaction between the media, scientists, institutions and politicians. After 2010, mindfulness became a component in a much wider discussion about the future shape of society, a conversation that did not always reflect the scientific evidence.

5. Hype, Harm and Uncertainty, Growing Unease in the Scientific Community

In 2015, Richard Davidson and Alfred Kaszniak produced a study that described methodological and conceptual challenges in mindfulness research.[83] Nevertheless, they found reasons for optimism in the corpus of mindfulness research. Arguing that widespread methodological problems were linked to the immaturity of the discipline. They claimed: 'It is important to underscore the fact that research in this area is still in its infancy though good progress has been made over the past decade.'[84] By this stage, thousands of peer-reviewed meditation and mindfulness studies had been published dating back to the 1930s. Mindfulness was being promoted for widespread use across society, and MBCT had been available through the NHS for a decade. Rather like the term 'promising', no qualification was expressed of what

[83] Davidson and Kaszniak.
[84] Davidson and Kaszniak. p. 17.

scientific 'infancy' meant in this context. Still, the authors anticipated that more research would lead to a better understanding of mindfulness.

By the late 2010s, the apparent failure of the contemplative sciences to put their own methodological house in order became a major concern for some meditation scientists. In 2018, a review by Nicholas Van Dam and 14 others, MtH, met the problems in mindfulness research head-on. Collectively, the co-authors represented one of the most influential groups of meditation scientists, clinicians, and scholars assembled to produce a meditation review.[85] For example, Clifford Saron and Sarah Lazar were highly experienced scientists, having spent decades investigating brain function and structure in different settings, including meditation. Their paper targeted both the implications of poor mindfulness research and its communication as scientifically reliable:

> Misinformation and poor methodology associated with past studies of mindfulness may lead public consumers to be harmed, misled, and disappointed. Addressing such concerns, the present article discusses the difficulties of defining mindfulness, delineates the proper scope of research into mindfulness practices, and explicates crucial methodological issues for interpreting results from investigations of mindfulness.[86]

MtH demonstrated the scientific problems linked to maintaining semantically distinct definitions of mindfulness.[87] And wide-ranging methodological issues were brought into a much sharper focus through a critical gaze. Van Dam and others argued that fault lines had developed between a traditional understanding of scientific reliability and areas of mindfulness research. The depth of the analysis and the strength of its condemnations lent MtH significant influence.

[85] Van Dam and others.
[86] Van Dam and others. p. 36.
[87] See: Nilsson and Kazemi.

There was no claim that mindfulness would not be able to improve patient outcomes; rather, it was a question of the reliability of the evidence supporting positive preliminary claims. In addition, MtH also saw the many variants of mindfulness as a part of the problem, and they argued that fluidity in operationalising those different forms of mindfulness led to further uncertainty:

> The ramifications of considerable semantic ambiguity in the meaning of *mindfulness* are multifarious. Any study that uses the term mindfulness must be scrutinized carefully, ascertaining exactly what type of "mindfulness" was involved, and what sorts of explicit instruction were actually given to participants for directing practice, if there was any practice involved. [88]

Further, MtH argued that when self-reported data was used in establishing definitions, it could lead to a methodology based on three variables: the scientific concept(s), the training method and the interpretation of self-report measures by participants and scientists.[89] Van Dam and others also confirmed the growing unease with descriptions of the construct validity of mindfulness.[90] Construct validity in psychology refers to the reliability of measures, such as self-report mindfulness scales, to reflect an abstract construct, such as mindfulness.[91]

Previous critical reviews generally invited scientists to improve the quality of their research. The cited Davidson and Kaszniak study suggested that their insights would catalyse change: 'With the incorporation of some of the conceptual and methodological desiderata we showcase above, we anticipate a vibrant and productive period for scientific research on

[88] Van Dam and others. p. 40.
[89] Van Dam and others. p. 39.
[90] Van Dam and others. p. 42.
[91] For more details see: Simon B. Goldberg and others, 'Does the Five Facet Mindfulness Questionnaire Measure What We Think It Does? Construct Validity Evidence from an Active Controlled Randomized Clinical Trial', *Psychological Assessment*, 28 (2016), 1009–14 <https://doi.org/10.1037/pas0000233>.

meditation in the future.'[92] But MtH took a more direct approach, arguing that mindfulness's position as a coherent group of scientifically validated practices was questionable: [93]

> Contemplative psychological scientists and neuroscientists, along with other researchers who study mental processes and brain mechanisms underlying the practice of mindfulness and related types of meditation, have a considerable amount of work to make meaningful progress.[94]

The paper also argued that the continued preliminary nature of mindfulness research made applied use of the training in clinical settings unlikely: 'On balance, much more research will be needed before we know for what mental and physical disorders in which individuals, MBIs are definitively helpful.'[95]

The paper points to problems greater than scientific reliability. According to Van Dam and others, mindfulness was widely supported notwithstanding scientific limitations: 'Despite the preceding list of concerns, there is a common misperception in public and government domains that compelling clinical evidence exists for the broad and strong efficacy of mindfulness as a therapeutic intervention.'[96] This claim echoes some of the issues raised earlier in this chapter in the analysis of the MAPPG report.[97] MtH illustrated the conflict between the traditional values of psychological sciences and the medicalised approach. By the time MtH was published, there were over 20,000 peer-reviewed mindfulness studies in the literature. That this level of investment (likely to have cost several billion pounds) has not led to greater certainty over the mindfulness concept is worthy of further consideration, which is not possible here. If we put aside the binary discussion of whether mindfulness research was reliable or not,

[92] Davidson and Kaszniak. p. 17.
[93] Van Dam and others.
[94] Van Dam and others. p. 51.
[95] Van Dam and others. p. 46.
[96] Van Dam and others. p. 46.
[97] MAPPG.

the mindfulness paradox also reflects wider problems in the psychological sciences. These concerns were articulated in Richard Davidson's and Courtland Dahl's responses to MtH.[98]

Davidson and Dahl were leading figures in the mindfulness research community, and their published reply was a powerful endorsement. Their only real concern was about the prescriptive agenda proposed by Van Dam and others: 'While we agree with all of the key points made in their article, there are a number of important issues omitted that are central to a comprehensive agenda for future research in this area.'[99] But Davidson and Dahl linked the mindfulness crisis to wider problems in psychological research: 'Many of the key methodological issues raised by Van Dam et al. are not specific to research on mindfulness.'[100] Davidson and Dahl provided examples of other cases of semantic ambiguity seen in experimental settings, such as in anxiety research, and they also shared concerns about the reliability of self-reported data in general.[101] Davidson's view of the corpus of meditation research between the publication of his paper with Kaszniak in 2015 and the letter with Dahl was a significant change. It supports the idea that MtH was a turning point, acknowledging a crisis in meditation and mindfulness research.[102] Seen in tandem, MtH and Davidson and Dahl's response may have been an attempt to stem the influence of medicalised mindfulness and impose more traditional research values. However, the proposed solution to the mindfulness paradox and crisis was more (better) research. That there may have been a fundamental ontological or epistemological impasse was not considered.

So, how can we make sense of the claims in strategic reviews, such as MtH, that thousands of meditation studies failed to establish methodological and conceptual reliability? The reaction of Davidson and Dahl indicates a general decline in the support for rigorous

[98] Davidson and Dahl.
[99] Davidson and Dahl, p. 62.
[100] Davidson and Dahl, p. 63.
[101] Davidson and Dahl, p. 63.
[102] Davidson and Kaszniak.

methodological approaches, such as RCTs. Mindfulness research may have been part of a wider trend that rejected the need for traditional clinical methodologies in complex areas of health and wellbeing. Craig Duncan and others argued in a 2018 paper that RCTs might not be the best way to research mental health treatments:

> However, work across a range of disciplines has suggested that the strengths of RCTs may not be sufficient to warrant their inherent place as the gold standard. Many of the criteria for a well-conducted RCT are often not achieved in practise because of attrition, lack of blinding and other biases post-randomisation. Moreover, RCTs are intrinsically better suited to some areas and research questions than others.[103]

It is probably too early to tell if the medicalised mindfulness approach was part of a broader movement away from using RCTs as a trusted form of scientific validation. However, the widespread and continued acceptance of MBCT illustrated that the medico-scientific establishment still valued robust scientific investigations.

Although mindfulness research continued to grow and views of its reliability were mixed, MtH appears to have been a watershed, and more critical reviews followed. For example, In 2019, Linda Schell and others published a Cochrane Review of studies investigating how the use of MBSR changed the quality of life (anxiety, depression, fatigue and sleep) in women diagnosed with breast cancer.[104] A Cochrane Review is a systematic study that attempts to establish an overview of reliable empirical evidence linked to a specific research question to inform treatment decision-makers.[105] Schell and others found fourteen relevant studies, of which ten were included in their review:

[103] Craig Duncan and others, 'A Realist Approach to the Evaluation of Complex Mental Health Interventions', *The British Journal of Psychiatry*, 213.2 (2018), 451–53 <https://doi.org/10.1192/bjp.2018.96>. p. 452
[104] Lisa Schell and others, 'Mindfulness-based Stress Reduction for Women Diagnosed with Breast Cancer - Cochrane Library', Issue 3.Art. No.: CD011518 (2019) <https://doi.org/10.1002/14651858.CD011518.pub2>.
[105] Cohrane Library, 'Cochrane Reviews', 2023 <https://www.cochranelibrary.com/> [accessed 2 July 2023].

> Fourteen RCTs fulfilled our inclusion criteria, with most studies reporting that they included women with early breast cancer. Ten RCTs involving 1571 participants were eligible for meta-analysis, while four studies involving 185 participants did not report usable results.[106]

The findings demonstrated that across the 1571 participants, MBSR had slight to no benefit in the short, medium and long term:

> MBSR may improve quality of life slightly at the end of the intervention but may result in little to no difference later on. MBSR probably slightly reduces anxiety, depression and slightly improves quality of sleep at both the end of the intervention and up to six months later. A beneficial effect on fatigue was apparent at the end of the intervention but not up to six months later. Up to two years after the intervention, MBSR probably results in little to no difference in anxiety and depression; there were no data available for fatigue or quality of sleep.[107]

The scale of published mindfulness research was so vast at the end of the decade that a review of one treatment area is not representative of mindfulness research in general. However, the above study illustrates a closer and more critical interest in mindfulness research. Even mindfulness studies that used the RCT methodology failed to validate significant clinical benefits scientifically when reviewed. This investigation also reports that earlier reviews in this same field of study found positive, significant effects from meditation. A final comment by the researchers was that none of the featured studies reported adverse events in patients.

6. The Adverse Effects of Mindfulness

As described in Chapter 4, Kabat-Zinn's original mindfulness investigation considered the potential of mindfulness to mediate a range of psychological measures alongside the first-

[106] Schell and others.
[107] Schell and others.

person experience of chronic pain. For example, the 1982 mindfulness study detailed changes to patients' 'total mood disturbance' (TMD) and 'psychological symptomology'.[108] However, this data was presented in an aggregated form.[109] There was little discussion of those patients who did not report physiological/psychological benefits or UAE. So, from its origins, MBSR's medicalised trajectory illustrated the benefits of mindfulness without detailed consideration of UAEs from scientific or therapeutic perspectives.

There have been occasional discussions about the harmful potential of meditation since the 1970s, but historically, this issue was not a priority in meditation research.[110] Goyal and others commented in their 2014 review: 'We found no evidence of any harms of meditation programs, although few trials reported on harms.'[111] However, the evidence is that after 2010, UAEs were discussed more frequently in the scientific literature. For example, in 2012, Patricia Dobkin and others considered groups of people for whom MBSR may be contraindicated. [112] In 2014, Edo Shonin and others gave the issue further consideration.[113] According to MtH, by 2016, the US's National Centre for Complementary and Integrative Health (NCCIH) was warning consumers through their website that meditation could cause or worsen psychological problems.[114] Van Dam and others estimated that less than one in four mindfulness studies had reported UAEs.[115] Although 22 papers published between 1973 and 2015 were identified in

[108] Kabat-Zinn, 'An Outpatient Program in Behavioural Medicine for Chronic Pain Patients Based on the Practice of Mindfulness Meditation: Theoretical Considerations and Preliminary Results'. p. 39.
[109] Kabat-Zinn, 'An Outpatient Program in Behavioural Medicine for Chronic Pain Patients Based on the Practice of Mindfulness Meditation: Theoretical Considerations and Preliminary Results'.
[110] For example, see this 1983 study that suggested a possible link between meditation and AEs: Frederick J. Heide and T. D. Borkovec, 'Relaxation-Induced Anxiety: Paradoxical Anxiety Enhancement Due to Relaxation Training', *Journal of Consulting and Clinical Psychology*, 51 (1983), 171–82 <https://doi.org/10.1037/0022-006X.51.2.171>.
[111] Goyal and others. p. 361.
[112] Patricia L. Dobkin, Julie A. Irving, and Simon Amar, 'For Whom May Participation in a Mindfulness-Based Stress Reduction Program Be Contraindicated?', *Mindfulness*, 3.1 (2012), 44–50 <https://doi.org/10.1007/s12671-011-0079-9>.
[113] Edo Shonin, William Van Gordon, and Mark D Griffiths, 'Are There Risks Associated with Using Mindfulness in the Treatment of Psychopathology?', *Clinical Practice*, 11.4 (2014), 389–92.
[114] Van Dam and others. p. 48.
[115] Van Dam and others.

MtH where experiment participants experienced UAEs that required additional treatment or medical attention.[116] Also, in 2019, Ruth Bayer and others reviewed the potential for UAEs in mindfulness-based programmes, finding that they might cause harm and that further research was necessary.[117]

Finally, in 2020, a systematic investigation by Miguel Farias and others brought increased clarity to the subject. In their analysis of 83 observational and experimental studies, the prevalence of UAEs was calculated as 8.3 per cent.[118] Suggesting that eight or nine participants out of every hundred experienced effects such as depression, cognitive anomalies, and occasionally even suicidal thoughts. Farias and others positioned their study as a major landmark in meditation research: 'In conclusion, this first systematic review of meditation adverse events covering almost five decades of studies has found a wide range of potential negative symptoms.' [119] Although there is a growing body of evidence that mindfulness training can lead to UAEs, the scale of their presence and significance is still emerging.

Mindfulness has been used clinically since the 1970s; major trials have been conducted with vulnerable populations. From both clinical and medical perspectives, it is surprising that there had been no large-scale systematic study considering the UAEs in meditation and mindfulness training before 2020 (according to Farias and others).[120] However, a further dimension of harm is linked to mindfulness, as described in MtH. Van Dam and others argued that alongside UAEs, harm might also arise from misleading claims made for the benefits of practising mindfulness:

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[116] Van Dam and others. p. 47.
[117] Ruth Baer and others, 'Doing No Harm in Mindfulness-Based Programs: Conceptual Issues and Empirical Findings.', *Clinical Psychology Review*, 71 (2019), 101–14 <https://doi.org/10.1016/j.cpr.2019.01.001>.
[118] M. Farias and others, 'Adverse Events in Meditation Practices and Meditation-Based Therapies: A Systematic Review', *Acta Psychiatrica Scandinavica*, 142.5 (2020), 374–93 <https://doi.org/10.1111/acps.13225>.
[119] Farias and others, 'Adverse Events in Meditation Practices and Meditation-Based Therapies'. p. 389.
[120] Farias and others, 'Adverse Events in Meditation Practices and Meditation-Based Therapies'.

> Much of the public news media has touted mindfulness as a panacea for what ails human kind, overlooking the very real potential for several different types of harm. According to directors of the National Center for Complementary and Integrative Health (NCCIH) at the NIH, the biggest potentials for harm of complementary treatments (e.g., meditation) are "unjustified claims of benefit, possible adverse effects . . . and the possibility that vulnerable patients with serious diseases may be misled."[121]

That such a claim was made almost four decades after the first clinical deployment of mindfulness in 1979 suggests that the intervention enjoyed a privileged position in the medico-scientific world. Despite the lack of any robust evidence for its value as a panacea, mindfulness has become a scientific and secular movement linked to widespread health and wellbeing benefits. In such a case, where tens of thousands of mindfulness experiments have failed to provide robust evidence of what mindfulness is and how it works, the role and value of science creation in this field must inevitably be reconsidered. The main question now is, can the psychological sciences learn from the history of mindfulness how to evolve systems and processes to efficiently and reliably evaluate the benefits of practices built on non-scientific knowledge?

7. Conclusions

Three conceptual threads run through this chapter and the thesis: the form of the medicalised approach adopted for mindfulness research led to and sustained a paradox, eventually creating a crisis in mindfulness research. The presence of these elements is visible in the literature. Medicalised mindfulness and the paradox were interdependent from the earliest MBSR studies, but the crisis only emerged in the second half of this decade. The crisis was created through the recognition that developing a health and wellbeing intervention on

[121] Van Dam and others. p. 47.

preliminary research held risks to the eventual end users. It also highlighted the problematic acceptance of low-quality mindfulness research as promising, that subjective values were sometimes used to provide a positive spin on limited experimental findings.

This chapter has illustrated causal relationships between these three threads and their impact, particularly in the UK. Kabat-Zinn confirmed in this decade that from the outset of his work with MBSR, he left definitions of mindfulness and mindful states to future scientists and academics. So, mindfulness began life free of any stable scientific frameworks. There is a great deal of evidence that MBSR was not consistent with a pan-Buddhist or pan-spiritual understanding of mind or matter and so was not supported by a rationale from any religious tradition. This lack of any theoretical framework created the medicalised trajectory, leading to proliferation with experimental uncertainty and establishing the promising but unproven paradox from which a research crisis emerged after 2017.

The momentum of the mindfulness revolution flowed from the previous decade; scientific research grew dramatically between 2011 and 2020. Mindfulness research and practice became intertwined with health and social policy, and preliminary scientific claims frequently received a positive reception from mindfulness stakeholders, including the media. Since 2000, MBCT has presented a scientifically robust model for mindfulness experiments, which was rarely followed by MBSR or MBI research. If anything, MBCT emphasised divisions between what can be characterised as ‘high-quality’ (traditional) and ‘low-quality’ (medicalised) mindfulness studies. The cost and time needed to produce RCTs was likely a disincentive to many researchers. A Cochrane review at the end of the decade illustrated that, even when conducted, mindfulness RCTs had contested findings. Repeated criticisms of limited methodological approaches had little impact on many experimental studies. Conversely, the sometimes sensational claims emerging from preliminary peer-reviewed studies attracted the attention of UK politicians and policymakers.

In 2015, *Mindful Nation* proposed a broad and complex agenda for mindfulness. Alongside a call for more MBCT research and practice based on peer-reviewed studies, there were wide-ranging endorsements supported by anecdotal and preliminary studies. *Mindful Nation* painted an over-optimistic interpretation of the benefits of MBCT and MBIs; important critical reviews and more cautious scientific voices are absent from the report. However, the study reflects the trend in the scientific literature more generally at this time. Evidence shows that the social policy agenda hijacked the scientific narrative in places. The 'mental capital' rationale presented in *Mindful Nation* positioned mindfulness as a tool to support mental health and a mind training intervention to sustain the UK's economic goals. The concept led to a proposal to introduce school children and young adults to mindfulness to protect the UK economy by increasing their resilience to more uncertain working conditions in the future. This controversial approach to meditation has rarely been analysed or discussed systematically and would benefit from further study. Using mental capital as a catalyst to deploy mindfulness in schools does not appear to have been supported by replicated scientific studies.

In this decade, mindfulness was endorsed by many stakeholders and policymakers despite credible and persistent warnings of limitations in its scientific foundations. This apparent contradiction indicates that the contemplative sciences and psychology generally have several moving parts that shape scientific engagement. That conflicting scientific realities could coexist, and the promotion of one 'scientific' view over another was led by a process that rested, in part, outside of a positivist/experimental environment. The enduring coexistence of two interpretations of the scientific reliability of mindfulness research, the paradox, should be a major cause of concern for psychology, science and the wider community.

The MAPPG report appeared at the high point of mindfulness's acceptance, but the lack of scientific objectivity reflected in social policy eventually provoked a push-back in critical studies. The negative language used in mindfulness reviews reached a new level after 2016,

demonstrating the strength of concern held by some scientists and signalled a research crisis. Creswell's accusation of 'fanaticism' and the use of words such as 'hype', 'harm' and 'misinformation' by Van Dam and others were harder to ignore than the polite requests for improved methodological approaches that characterised earlier systematic reviews. Low-quality mindfulness research was widely accepted in this decade, and until MtH, the use of mitigations such as 'immature science', 'promising but not proven' and 'more research is needed' gave a misleading impression about the state of scientific understanding.

There does not appear to be one single overarching explanation for the mindfulness revolution. The medicalised trajectory led to a rapid proliferation of MBIs, and preliminary studies, particularly when the training was delivered to groups of participants, created the sense that mindfulness was or could be a low-cost panacea. Claims that mindfulness could support commercial, military and civil activities increased the number of mindfulness advocates. The assertion that mindfulness was based on an unknown and undescribed union between Buddhist and scientific knowledge also appealed to supporters of more spiritual and less mechanistic solutions to health and social problems. The acceptance of Kabat-Zinn's'bridging' hypothesis in self-help form may reflect a wider Western dualistic approach to knowledge systems, where the coexistence of both religious and scientific truth is problematic, and the dominance of religion or science or their fusion presents a more satisfying worldview. However, the conceptual freedom that enabled mindfulness to be of apparent value in many different disciplines also limited its scientific validation.

In this chapter, the relationship between the medicalised paradigm and the paradox begins to emerge in the scientific literature. Early in the decade, Brensilver, Chiesa and Serretti argued that medicalised mindfulness was not Buddhist but also lacked a coherent theoretical framework in its relocated form(s). If true, these claims suggest that far from being a bridge between Buddhism and science, medicalised mindfulness was incongruent with both

knowledge systems. Mindfulness's fluidity meant that scientists often interpreted the mindfulness concept differently; Nilsson and Kazemi's 2016 analysis confirmed the presence of multiple expressions of mindfulness in the peer-reviewed literature. Competing and uncertain definitions of mindfulness inevitably created difficulties for the continuity of scientific understanding and experimental replication. The scientific history of mindfulness reveals a major problem in how scientists engage with traditional knowledge; even today, unevidenced claims about Buddhist meditation and mindfulness limit contemporary research. There is a possibility that a dualistic worldview present among Western scientists distorts scientific engagement with traditional non-dual knowledge. Attempts to combine distinct knowledge systems, as in the case of mindfulness, may remove curative potential during relocation. Despite a huge investment in mindfulness research, there has been modest scientific interest in the original religious mindfulness practices from ontological or epistemological perspectives. As such, we know little about the cognitive processes present and the curative potential of traditional meditation practices.

Conceptual uncertainty in mindfulness research is connected to Kabat-Zinn's original claims about the mindfulness concept. However, the long-standing methodological limitations are harder to understand. Two possible explanations are that the pragmatic and methodologically limiting approach established by Kabat-Zinn's original work set an enduring trajectory that others followed. Conversely, a wider movement or paradigm shift away from mechanistic scientific evaluations (RCTs) of health and wellbeing influenced the contemplative sciences. However, in every instance, two different scientific cultures are visible in the mindfulness literature: the medicalised and traditional approaches. Medicalised mindfulness was the 'revolution', creating large numbers of preliminary studies and making enthusiastic claims that attracted interest across society. The traditional scientific approach was particularly visible in meta-studies that criticised preliminary medicalised findings. The evidence is that

scientific attitudes to mindfulness were not fixed and changed over time. Most scientific outputs were neither totally traditional nor medicalised. Preliminary psychological studies are often methodologically weak or lack stable theoretical frameworks. A core problem in mindfulness research was reporting initial findings as scientifically reliable and using them as the basis for later work. This process inevitably led to an uncertain foundation for the MBSR paradigm.

The increased presence of neuroscientific research added data to the scientific understanding of mindfulness's effects on brain function and structure, but studies were often correlational rather than causal. The established problems in psychological mindfulness studies, such as theoretical and methodological limitations, also appeared in neuroscientific papers. Reviews of neuroscience experiments also revealed two problems rarely discussed elsewhere—the potential for bias when committed meditators (scientist-practitioners) researched meditation. And secondly, the absence of studies showing negative effects pointed to a publication bias. The lack of discussion about the role of committed meditators or Buddhists at the heart of the research process is surprising and is worthy of further investigation.

MtH illustrated that the mindfulness paradox had become a crisis and offered critical insights and an agenda for change. However, the approach adopted by the co-authors was still locked into the paradox—the struggle for supremacy between medicalised and traditional psychological insights. Van Dam and others argued that more, better quality research could solve the problems, but this solution has been proposed repeatedly since the 1970s. By 2020, further critical reviews were published and discussed in the media. Hence, the challenges to the medicalised paradigm after 2016 appear to have brought more balance into scientific and popular discourses.

Even in the context of this one decade, this scientific history highlights important questions about science creation. After 2011, the scientific trajectory of mindfulness appeared almost out of control, with informal systems of scientific regulation and governance unable to counter the swathes of exciting but preliminary results. Mindfulness's growing momentum carried it forward despite the risks from unreplicated experiments. Based on the evidence, it is impossible to place the mindfulness crisis at the door of experimental psychology alone. The mindfulness revolution was a collective process, and many agencies encouraged wider public interest. Mindfulness, at times, became an aspiration rather than just an object of positivist enquiry. It was endorsed by scientists, politicians, the business community and, of course, religious practitioners. This complex matrix reflects the reality of science in the public sphere, where experimental reliability is only one factor in science creation and acceptance.

Chapter 8: Meta-Conclusions

1. Introduction

Multiple forces pushed and pulled mindfulness into its current configurations, from which I have attempted to identify and evidence the most influential. The intersection of belief and science is a complex and under-researched area; few peer-reviewed accounts exist that investigate how personal convictions impact the creation and reception of experimental findings. Based on this research, belief and non-belief can profoundly influence the processes of science creation. However, these influences depend on different factors, including the wider socio-cultural context in which the scientists work. The development of mindfulness illustrates the fundamental role individual agency, institutional needs, and political goals play in how the psychological sciences produce knowledge. When the scientific method is used reliably, objective 'scientific' data can be created. However, when theoretical frameworks, experimental design, and the interpretation of data tend to pragmatism and subjectivity, they need to be treated cautiously. In this way, experimental psychological investigations do not produce reliable findings as a matter of course but as one element within a wider framework. Having advanced this hypothesis, I also acknowledge that my scholarly research may be limited for similar reasons, and further consideration of these findings through systematic investigation is desirable.

The conversion of traditional or religious knowledge to scientific understandings without consideration of ontological implications appears irrational and unscientific. While science can observe the effects of spiritual practices, it does not have the theoretical framework to understand or engage with them. In the development of MBSR, the bridge between the spiritual and the scientific was the scientist-practitioner, not the scientific practice. At the outset

of mindfulness research, the simple question, 'Are science and belief congruent?' could have placed MBSR on a completely different trajectory. This failure suggests that the scientific method can be underpinned by beliefs and convictions regarding what reliable science is. MBSR adopted components of traditional practices but uncoupled them from their theoretical frameworks, altering their essential nature and curative potential. This translation explains the proliferation of mindfulness into many diverse applications, some potentially at odds with Buddhism, such as military training and the promotion of mindfulness in support of the mental capital agenda.

In the early chapters of the thesis, the scientific landmarks and the forces influencing them appear quite explicit. The later chapters reflect a much larger body of work where strategic reviews are required to establish an overview of mindfulness research and practice. I have constructed a scientific history around three interconnected concepts: medicalised mindfulness and the mindfulness paradox, which led to the mindfulness crisis. In addressing my overarching research questions, the causal relationship and implications of these three strands are described and evidenced. The paradox has been confirmed in multiple peer-reviewed accounts, illustrated by the conflict between positive preliminary studies and strategic research reviews. However, few scientific studies have attempted to explain its origins and influence over mindfulness research; this is one of the main gaps in knowledge that this thesis addresses.

I have focussed on scientifically 'reliable' and influential studies to support my work. However, conflicting accounts in the scientific literature have undermined what constitutes a reliable scientific claim. As such, this thesis attempts to hold an agnostic position on the benefits of mindfulness, focusing on scientific engagement and the related processes and discourses that took place. I have prioritised the contradictions and uncertainties in mindfulness research and practice in my study, highlighting the contested areas of theoretical and

methodological approaches. My investigations avoided, where possible, philosophical discussion of what 'good' science might be, using the standards adopted by the scientific communities that research meditation to position their work.

The most complex part of this research has been understanding science creation in the areas where different knowledge systems, such as psychology and Buddhism intersect. Analysis of these areas has been essential in demonstrating the connections between major scientific milestones and the forces that led to their creation and acceptance. The mindfulness paradox is directly linked to the attempted integration of Buddhist knowledge in the design of MBSR. While scholars of religious studies have widely criticised the claimed congruence between MBSR and spiritual practices, there are almost no scientific insights into the consequences of this approach. These concerns are at the heart of this research and have necessitated an original transdisciplinary approach.

Despite the methodological problems visible in mindfulness research since the 1980s, it is surprising that scientists have rarely discussed unevidenced claims about its theoretical foundations. Insularity and narrow disciplinary outlooks in the psychological sciences have hindered the understanding of the mindfulness paradox and the development of more clinically viable meditation therapies. Frequently, scientific studies use earlier investigations as the foundations for research and practice; this approach is vulnerable if a paradigm, such as medicalised mindfulness, is created on incomplete or partial insights. Major scientific projects, such as the four-year follow-up on the benefits of MBCT in 2000, cited a preliminary mindfulness experiment which had not been peer-reviewed. The uncritical acceptance of the early-stage research helped to establish medicalised mindfulness as a promising health and wellbeing intervention. From a historical vantage point, methodological reliability and robust replication appeared to have been optional in mindfulness research, and their absence was no barrier to the publication of concrete claims in prestigious scientific journals.

As well as documenting the scientific history of mindfulness, this thesis also signposts the need for greater interdisciplinary and transdisciplinary research if non-scientific knowledge is to be successfully recruited into medico-scientific paradigms. Following this introduction, the meta-conclusions of the study are presented in overarching themes. The final section of this chapter is a postscript that analyses two media articles highlighting recent developments in mindfulness meditation.

2. The Relationship Between Belief and Science

At the start of the twentieth century, different views about the relationship between religious and scientific knowledge can be found in peer-reviewed literature. At one end of the spectrum, the psychologist Leuba hypothesised that science and religion were in conflict; there is, after all, a presumed tension between science and faith. In contrast, the philosopher Paul Carus saw unity in scientific and religious understanding. Neither of these positions was established scientifically; they appear to reflect the beliefs or values of academics rather than their systematic analysis. Both Leuba and Carus argued for a position that reflected their worldview. In the early decades of the 20th century, Carus worked with Suzuki, a Zen teacher, in the promotion of the RoS in the USA; in this way, a link between Buddhism and science was forged. However, neither Carus nor Suzuki considered how, ontologically, religion and science might be compatible. Suzuki eventually collaborated with Fromm on the development of Zen Psychotherapy, and through this intervention, Buddhism and psychology were formally drawn together in a health intervention.

This agency of scholars and scientists to accept or reject a theoretical congruence between belief and religion was present in the development of medicalised meditation and played a central role in its scientific history. However, changing attitudes towards belief in

society have also influenced scientific engagement with meditation. The ebbing and flowing of research often reflected socio-cultural changes in communities, such as the Counter-culture in the USA and UK during the 1950s. This cultural shift promoted the health benefits of Eastern spiritual practices. It led to the development of narratives encouraging the convergence of psychology and religious insights, illustrating how non-scientific forces underpinned significant changes in meditation research and practice.

While Kabat-Zinn argued that MBSR was a bridge between Buddhist and scientific knowledge, his approach should be seen in the wider context of a medicalised meditation movement. The Counter-culture increased interest and acceptance of Eastern ways of knowing in the USA, leading to closer boundaries between belief and science. One scientist, Wallace, argued that the traditional Hindu understandings underpinning TM practice were congruent with positivist insights and could deliver multiple health benefits; this was the start of the medicalised meditation movement. Wallace was joined by an established health researcher, Benson, who, motivated by the claimed health potential of TM and his own agenda, went on to create the RR. Kabat-Zinn developed mindfulness meditation in 1979 when the popularity and success of TM and the RR were at their peak.

Although TM, the RR and MBSR share medicalised characteristics, their positioning with health and science were different. Wallace's work cited earlier scientific studies of a range of meditation techniques, but he argued that TM was uniquely qualified to be a meditation-based health intervention. Conversely, Benson and others positioned the RR as the essential ingredient of multiple spiritual practices from the East and West, which were configured into a universal relaxation method. Both TM and the RR were developed around a rationale that later experiments attempted to validate. When first deployed, MBSR was presented as a treatment-specific intervention originating from Kabat-Zinn's interpretation of a pan-Asian mindfulness concept. However, unlike TM and the RR, after 1985, MBSR rapidly developed

as a panacea, with few limits on its potential application. The claims of congruence between religious knowledge and science and the presentation of meditation as a panacea link Kabat-Zinn's and Wallace's work. Benson's approach also influenced Kabat-Zinn's thinking. MBSR was originally presented as a synthesis of mindfulness, not unlike the generalisations of religious practices made in the creation of the RR. Kabat-Zinn claimed he did not have a theoretical understanding of mindfulness when he developed MBSR; he hoped scholars and scientists would provide these later. The insistence that MBSR lacked a scientific rationale to support its use and uncontrolled diffusion both helped and hindered scientific understanding of MBSR. Kabat-Zinn and others repositioned mindfulness at different times without ever explaining what it was being transformed from and to. The MBSR rationale appears to have been moved towards the RR concept in the mid-1980s, becoming closer to the idea of a generic relaxation technique while still maintaining elements of a treatment-specific intervention.

Kabat-Zinn's main innovation in the evolution of medicalised meditation to medicalised mindfulness was to claim that MBSR was congruent with Buddhist and scientific insights. Benson promoted TM as an understanding of consciousness that science could learn from traditional religious texts and practices. However, Kabat-Zinn and others presented MBSR as modified or adapted insights from numerous knowledge systems stripped of spiritual and cultural concepts to be resituated in a contemporary medico-scientific setting.

Wallace presented TM as a traditional religious meditation method. The aggregation of spiritual practices in both RR and MBSR lacked systematic scientific foundations. Explanations about those practices were made from outsider (scientific) perspectives, claiming insider (religious) understanding; therefore, they risked misunderstanding the nature and goals of their methods. This limitation was less problematic for Benson, who sought to illustrate the reliability of his rationale through experimental studies. However, MBSR initially only used science to validate the benefits of the practice; therefore, there was no testable hypothesis and

no causal link between mindfulness meditation and clinical change could be proven. This issue is central to the scientific history of mindfulness. MBSR was developed as a health intervention without a theory of how it mediated health.

As the previous paragraphs indicate, a major problem in understanding and evaluating Kabat-Zinn's mindfulness claims is the concept's uncertainty and fluidity. Although MBSR was positioned as a bridge between Buddhism and science, it did not offer a stable rationale from either of these perspectives. Kabat-Zinn became the bridging mechanism, never fully disclosing how religion and science had been integrated or how others might test his claims. The processes through which multiple forms of mindfulness were aggregated and relocated were never explained. Consequently, scientists and clinicians have attempted for decades to establish the mechanisms of mindfulness. Analysis of the original descriptions of MBSR and accounts of scholars in the field suggests that it began as a variant of Insight Meditation with the addition of posture yoga. However, as Kabat-Zinn admitted, yoga was not a mindfulness practice, which adds another layer of theoretical uncertainty to MBSR. If mindfulness training could be delivered by an activity practised mindfully, the boundaries between mindfulness training and other human behaviours are opaque. Mindfulness manifests in the literature as a moving or evolving concept. Without clear definitions, multiple variants emerged, and today, mindfulness can be an unhelpful umbrella term for many scientifically unrelated MBIs. The unevidenced claim that MBSR was a bridge between science and belief is rejected by this thesis, and I also argue that the idea has obstructed the creation of a stable theoretical framework.

The attempted integration of religion and science in MBSR appears to have been an aspiration to bring Buddhist values into Western medico-scientific thinking shared by Kabat-Zinn and others. However, the bridging hypothesis reflects a dualism in Western scientific thought, which ignores the value of different knowledge systems at the ontological and

epistemological levels. In this context, duality describes a dichotomy between belief and science. Conversely, nonduality reflects a worldview where religion and science can exert complementary influence in their own spheres. Rather than combining or integrating science and religion, which is probably impossible, the relocation uncoupled mindfulness from Buddhist and scientific rationales. There is evidence that the relationship between belief and science is culturally situated. While many scientists in India and Japan accepted the coexistence and independence of spiritual and scientific knowledge systems, there has been a tendency among Western meditation scientists to establish one dominant worldview: scientific, religious or integrated.

The conflict hypothesis in Western scholarship placed belief and science in opposition for much of the 20th century, seeking to champion the value of science. However, the RoS, Zen Psychotherapy and the medicalised meditation movements attempted to merge or combine scientific and religious knowledge, subordinating or creating composite understandings from different systems. In mindfulness meditation research, many scientists and scholars seem to have been unable to accept the presence of stable, albeit ontologically incongruent, alternative knowledge systems, choosing to ignore non-scientific knowledge or reduce it to scientific terms. It seems probable that Kabat-Zinn's relocation of Buddhist insights to scientific domains altered its fundamental characteristics and thus changed its curative potential. Another issue worthy of closer investigation is the extent to which the Western dualistic approach to traditional knowledge has limited reliable scientific understanding in other contexts where the spiritual and non-scientific intersect. Further research exploring the presence of dualistic imaginaries in Western understandings of nativist and spiritual concepts is recommended. My research also suggests that dualistic insights likely limited the scientific evaluation of non-scientific health systems, such as TCM.

3. Proliferation

At the outset, the curative potential of mindfulness had to be established pragmatically, with experiments demonstrating correlations between MBSR training and improved health outcomes. Methodological and theoretical limitations in MBSR created uncertainty in research findings but did not stop the claims of impressive clinical benefits. After 1985, MBSR came under pressure when medicalised meditation experiments were increasingly subject to critical scientific reviews. Kabat-Zinn and others reacted to these challenges by embarking on a proliferation programme, using mindfulness in various scientifically unrelated applications. Diversification became simple without the restrictions of following an established theoretical framework or the need to develop costly and time-consuming RCTs. Mindfulness could be transplanted to any setting that might deliver preliminary evidence of health benefits. Limited early-stage studies were sometimes cited as part of the rationale for later work. The 2000 MBCT paper referenced the use of mindfulness in a 1988 trial for psoriasis treatment.[1] However, that trial was published as an article of correspondence in a journal; the study was incomplete and not peer-reviewed.[2] The MBCT RCT became a game changer for the perceived status of mindfulness. The acceptance of this treatment by the NHS was central to the growth of the mindfulness concept, although few MBI studies ever repeated the quality of its RCT approach. MBCT research strengthened the idea that mindfulness was a low-cost alternative to other treatments and fed into the panacea narrative developed through the proliferation campaign.

Despite the progress made by MBCT, the lack of an overarching theoretical explanation defining mindfulness and its underlying cognitive processes was scientifically problematic.

[1] Teasdale and others.
[2] Bernhard, Kristeller and Kabat-Zinn.

Still, with a flexible approach to theoretical and methodological concerns, mindfulness experiments could be conducted in almost any field, and the promise that mindfulness could transform health, wellbeing and even the wider society inevitably boosted research interest. The main challenge to the progress of mindfulness in the early 2000s was how to scientifically validate the exciting findings emerging from early-stage research.

A visible tendency in medicalised meditation is the willingness of scientist-practitioners to promote the benefits of their techniques ahead of robust scientific validation. In that early stage, scientific accounts could be used to support the promotion and commodification of meditation methods to the public. The wider proliferation of practices such as mindfulness has been supported by their communication through different media, where the audiences may have been unfamiliar with the importance of reliable scientific validation and replication. The criticisms expressed in MtH drew attention to this issue and highlighted their risks. However, a significant problem is the publication of preliminary studies in peer-reviewed scientific and academic journals that make concrete claims. There may be a wider misunderstanding in society of how science is created and what the publication of a peer-reviewed article represents.

4. Scientist-Practitioners

In 1970, Wallace was a committed TM practitioner when he published research claiming that non-dual Hindu knowledge was consistent with scientific insights. Kabat-Zinn was linked to different Buddhist teachers and attended a religious retreat before launching the MBSR treatment. Throughout the development of mindfulness, scientists with religious convictions conducted experiments evidencing the benefits of Westernised mindfulness. Throughout this thesis, I have used the term scientist-practitioners to identify meditation scientists with connections to the belief-based methods they researched.

Very little scholarly work has been published about the impact of an individual's religious views on their scientific activity. Scientists such as Wallace and Kabat-Zinn, who confirmed their interest in religious practices, are relatively rare. There is evidence of other committed spiritual practitioners involved in demonstrations of the clinical benefits of mindfulness, such as Teasdale, Segal and Williams. Both Wallace and Kabat-Zinn made their motivation to show the health benefits of religious practices clear. It seems likely that religious (or political or philosophical) beliefs might influence a scientist's experiments and the interpretation of results. The assumption that science creation is a 'pure' process where methodologies can prevent bias in experimental settings is challenged by this scientific history. Further research is necessary to consider if the notion of bias and conflict of interest in science creation may need to be strengthened to include the personal convictions of scientists.

As discussed in Section 2 of these meta-conclusions, how scientists perceive the relationship between belief and science is likely culturally rooted. Meditation scientists in India and Japan do not appear to have seen religion and science as mutually exclusive knowledge systems. For example, in published meditation studies from Japan in the 1960s, Zen Buddhist concepts are described in the literature without influencing the scientific perspective. Thomas has confirmed that this coexistence continues to this day in Indian laboratories. However, in the West, scientists such as Wallace and Kabat-Zinn attempted to converge or align the different knowledge systems. The risk of bias seems likely in settings where Western scientists are trying to establish the value of the knowledge system they are adherents of.

Wallace began relocating TM to medico-scientific domains with a determined effort to present the non-dual Hindu insights on which TM was based as scientifically valid. Kabat-Zinn introduced MBCT as an integration or fusion of science and non-science. Despite their links to Eastern religious traditions, these early Western meditation scientists appeared to perceive distinct knowledge systems as compatible, where only one view (scientific, religious or their

integration) could reflect reality. The reduction and aggregation of complex, ontologically distinct knowledge systems is observable throughout the history of meditation. The willingness of scientific communities to accept the subordination of religious knowledge rests at the heart of methodological and theoretical limitations in mindfulness research. As described in Chapter 1, Kabat-Zinn's attempt to aggregate multiple mindfulness practices is particularly problematic as different Buddhist schools have world views that cannot be combined without fundamentally changing the nature of the original practices. The relationship between science and religion expressed through scientific investigation was complex in mindfulness research.

Because the religious convictions of scientists are often treated as a private matter, understanding their influence is challenging. Kabat-Zinn was among the few scientists who wrote about his motivation to bridge or shift the boundaries between belief and science. The impact of 'silent' scientist-practitioners who did not disclose their religious affiliations is difficult to estimate. Kabat-Zinn's accounts also reflect fluctuations in his positioning of mindfulness. In his peer-reviewed writings, the explanation and role of Buddhism in MBSR changed over time, as did his use of Buddhist terms and concepts. Based on the evidence provided in the literature, Kabat-Zinn presented a personal view of mindfulness and Eastern religious knowledge, which was broadly accepted by the scientific community. The challenges to the bridging hypothesis received a more sceptical reception from scholars of Buddhist studies. While scientist-practitioners offered new insights into the curative potential of meditation technologies, the dualistic tendency to combine or converge knowledge systems led to increased uncertainty in the scientific understanding of traditional knowledge.

5. Medicalised Meditation

In this thesis, medicalised meditation describes the combination of traditional religious practices with science to create Westernised health interventions. The concept appears as an attempt to bring science and spiritual practices closer together, as with TM and MBSR, or as an appropriation of religious knowledge and techniques, as with Benson's development of the RR. The primary focus of medicalised meditation research was to demonstrate the health benefits of the interventions, not establish causal explanations. Medicalised approaches proposed health benefits, only later attempting to evidence the mechanism through which they might be achieved. Different forms of medicalised meditation shared similarities and differences. Kabat-Zinn tried to avoid the potential ontological conflict in relocating Buddhist meditation through claims of congruence between religious knowledge and science. However, the bridging hypothesis stripped MBSR of any coherent theoretical framework.

The medicalised meditation model established for MBSR was first described in 1982 and became paradigmatic, enduring to this day. The introduction of MBCT demonstrated that mindfulness research could be successfully investigated using robust RCT methodologies. However, after 2000, most published mindfulness experiments continued to engage with the MBSR model. A key question is why so many scientists followed the medicalised approach when it had known methodological flaws and seemed unlikely to produce replicable results. One possible answer is that the success of early medicalised experiments may have inspired scientists to move towards less mechanistic and structured research in order to deliver meaningful therapeutic interventions without the need to establish testable hypotheses. An alternative possibility is that the nature of psychological research often rests on following an established paradigm, that mindfulness researchers base new investigations on an uncritical acceptance of earlier investigations despite the uncertainty surrounding the origins and

rationale of MBSR. This possibility implies some form of institutional inflexibility or incommensurability may be built into the process of science creation in the psychological sciences. Understanding why the medicalised research model remained influential for decades, despite multiple warnings from strategic reviews is worthy of closer attention.

As previously mentioned, the scientists developing medicalised forms of meditation did not solely rely on scientific processes and regulated medical interventions to endorse or promote meditation's potential. Wallace, Benson and Kabat-Zinn effectively used science and peer-reviewed scientific articles to draw attention to the benefits of these practices. Medicalised interventions were promoted through self-help books, interviews and many other communication channels. In the case of mindfulness, the successful promotion of the potential of MBSR in the 1990s to the general public did not immediately increase scientific interest. Still, it likely raised awareness across society more generally. From a historical perspective, it appears that science was used both to create a better understanding of the health potential of mindfulness in the scientific community and to signpost its reliability to potential consumers and stakeholders in society.

6. Relocation and the Bridging Hypothesis

As a case study of how non-scientific knowledge relocates to scientific disciplines, mindfulness illustrates problems and opportunities for scholarly communities. A key issue is the subordination of knowledge, related to the dualism of championing scientific insights over other ways of knowing. In mindfulness research, this positioning occurred when scientists attempted to relocate Eastern religious practices to medico-scientific domains. For example, the removal of religious and cultural knowledge from traditional mindfulness methods in

creating MBSR is described in Kabat-Zinn's 1982 paper.[3] Over time, scholars, scientists and even Kabat-Zinn pointed out that essential operational elements, such as compassion, intention and ethical concepts, had been removed or lost in transition. Kabat-Zinn, in common with some other meditation scientists, had experience with Eastern religious traditions, but the reliability of this knowledge, or at least how it was expressed in the literature, has been widely criticised by scholars of religious studies. This same issue appears in other areas where science seeks to come to terms with knowledge that does not conform to scientific or biomedical frameworks, such as acupuncture. The scientific method can reliably evaluate the clinical effectiveness of non-scientific practices, but when those practices are altered, then something else is happening, and the original knowledge may no longer be accessible. If traditional technologies and ways of knowing are to be adopted by science, establishing a reliable scientific understanding of the actual practices is essential.

A problematic characteristic of medicalised meditation is the lack of attention given to ontological and epistemological congruence. The original descriptions of MBSR juxtaposed scientific and religious knowledge without consideration of the underlying theoretical frameworks. In the 1982 discussion of MBSR, no explanations of Eastern mindfulness traditions and their congruence with science were advanced. According to some scholars, the characterisation of Buddhism as a religion based on a singular ontology continued a mindset developed during British colonialism. Frequent criticisms of understandings of Buddhist knowledge present in explanations of MBSR were ignored by the majority of scientists working in this field. Relocation can be seen as converting traditional knowledge to imaginaries that reflect Western insights rather than investigating new ways of knowing. While imaginaries of mindfulness and Buddhism can create new hybrid understandings, they risk losing key

[3] Kabat-Zinn, 'An Outpatient Program in Behavioural Medicine for Chronic Pain Patients Based on the Practice of Mindfulness Meditation: Theoretical Considerations and Preliminary Results'.

components of the original technology and curative potential. More work is needed by Western researchers to understand the different ontologies of Eastern religious traditions. Without such insights, claims of integration between traditional and medicalised meditation methods should be treated cautiously. A concern about the bridging hypothesis is that it appears to be based on an outsider perspective but claims insider knowledge. It seems that in the 1970s and 1980s, the privileged position of Western scientists working at elite institutions allowed them to make sweeping generalisations of religious knowledge and practices. If scientists translate the non-scientific knowledge they encounter from an outsider's perspective and claim their insights reflect the insider perspective, misunderstandings and limitations are likely.

Kabat-Zinn's religious convictions, illustrated in different publications such as his 2011 retrospective journal article 'Some Reflections on the Origins of MBSR, Skillful Means, and the Trouble with Maps', underpin the trajectory of MBSR.[4] However, a foundational idea of Buddhist knowledge is causality, that human suffering has a cause and can be successfully treated if correctly diagnosed. Biomedical science also maintains the importance of evidence-led treatments. It is, therefore, somewhat surprising that MBSR was developed as a pragmatic intervention and, in some senses, was a movement away from the existing rational scientific and Buddhist approaches, increasing uncertainty regarding what it was and how it worked. Kabat-Zinn's expectation that experts in the field would deliver reliable scientific explanations of his interpretation of mindfulness after it had been used on patients is problematic from clinical and scientific perspectives. These insights lend weight to the argument that MBSR lacked a coherent theoretical framework consistent with either science or Buddhism from the outset. The early clinical uses of mindfulness produced impressive claims, which ultimately attracted the interest of other scientists and clinicians. Further research in different areas, such

[4] Kabat-Zinn, 'Some Reflections on the Origins of MBSR, Skillful Means, and the Trouble with Maps'.

as MBCT, led to the proliferation of mindfulness into MBIs, often influenced by Kabat-Zinn's rationale based on the bridging concept.

7. Research and the Creation of the Mindfulness Paradox

The quality of experimental research that investigates the benefits of mindfulness is variable, but the presence of high-quality investigations, such as MBCT studies, boosted the reputation of mindfulness research after 2000. However, the conditions for the mindfulness paradox were brought about by the significant amount of 'low-quality' mindfulness research, which frequently made positive claims based on limited experiments. Strategic reviews and meta-studies, particularly after 2000, illustrated this problem, characterising mindfulness research as promising but not proven. The lack of scientific validation for many of the claims made for mindfulness is a chronic problem. A system of science creation that establishes two mutually exclusive scientific opinions draws attention to limitations in the psychological sciences. A conceptual and operational conflict seems inevitable when mindfulness experiments were described positively and negatively in peer-reviewed literature. This uncertainty allowed politicians, scientists, social policy agents and other stakeholders to adopt and promote the research that reflected their own agendas, able to confidently claim that their view was informed by science. Scientists and clinicians created new knowledge, proposed new treatments and wrote books and journal articles based on cited peer-reviewed sources despite established scientific concerns. Limitations in preliminary medicalised meditation research have been described since the 1970s and have coexisted with traditional science for over 40 years. This level of uncertainty cannot be put down to Kabat-Zinn's work alone; the machinery of science creation sustained it. The mindfulness revolution thrived on uncertainty; many of the 'low-quality' preliminary studies may have discovered important new knowledge or

potential treatments, but they were frequently not subject to robust validation. It is problematic that concrete claims were often made in peer-reviewed literature and repeated in the media ahead of reliable scientific validation, such as RCTs. In addition, MBSR appeared when cultural, social, economic and political forces were able and willing to support a medicalised pragmatic health treatment. That an authoritative review made claims of hype and misinformation surrounding mindfulness research four decades after MBSR was first is a major concern. The history of mindfulness raises profound questions about scientific governance and regulation, leading to the questions of what is science, how is it created and why?

One of the overarching impressions of researching this scientific history is the waste of resources brought about by the mindfulness paradox. While preliminary and pilot studies are a normal part of science creation, the lack of replication in mindfulness suggests an unfinished or incomplete concept. Experimental findings obtained despite inadequate control measures, a lack of randomisation and low participant numbers (statistical power) were often well received by mindfulness stakeholders. A major review of the entire body of literature would be required to evaluate the amount of research where findings could or would not be replicated, but there will likely be thousands of studies. Mechanisms of scientific governance could have challenged the paradox much earlier. If the peer-review of the 1982 MBSR paper had insisted on evidence to support the claims about the nature of Buddhist mindfulness, its scientific trajectory could have been very different. While strategic reviews criticised low-quality research, they also offered mitigations that sustained the paradox, such as meditation research, which was promising but scientifically immature. The lack of analysis of the root causes of the mindfulness paradox has been a major limitation in how scientific understanding of meditation and mindfulness has developed. It is also perhaps important to note that after the publication of MtH, two contemplative scientists, Davidson and Dahl, argued that limitations in mindfulness research were more generally a reflection of the psychological sciences. This idea

suggests a scientific culture where experimental flaws were accepted as part of the process of science creation in psychology.

Pragmatic science has a role in health and wellbeing research. Establishing reliable correlations between a treatment and health improvements can lead to the successful adoption of new therapies and interventions. However, one of the enduring problems in mindfulness research was combining a pragmatic approach with methodologically limited experiments to make positive claims. The reluctance to use randomisation and effective controls in mindfulness experiments meant that evidence of a robust correlation was often rare. In large numbers of studies, it was also unknown if mindfulness training led to mindful states in participants, and so the cause of health benefits could not be definitively attributed to the intervention.

If a large body of mindfulness research was not grounded in testable hypotheses and thus causal explanations, how did it grow rapidly and become so influential among scientists? There is not one clear answer to this question. The important cultural shifts in the 1950s and 1960s that supported the rise of medicalised meditation were less influential in the 21st century. There appears to be a correlation between the scientific acceptance of MBCT, its endorsement by NICE and the explosive growth in mindfulness research seen after 2003. As time progressed, the convergence of the different agendas of mindfulness stakeholders (health, education, business, social policy, and even the military) increased the interest in the concept. There was also a correlation between the growth of peer-reviewed studies and print media articles after 2000. The publication of popular books and other media proclaiming the widespread benefits of mindfulness is likely to have further increased the public appetite. The glowing endorsements for MBCT and the future potential of MBIs in the MAPPG report in 2015 further encouraged more scientific and clinical interest. Suggestions that mindfulness could be a panacea and more cost-effective than other treatments, such as CBT, would have

appealed to scientists, clinicians and healthcare organisations. The growing notion that mindfulness could impact social cohesion and the UK's economic performance increasingly fuelled political enthusiasm for mindfulness training across society after 2010.

There appears to be a degree of experimental complacency among some meditation scientists, and journal articles with repeated methodological problems are commonplace. The response of many contemplative scientists to the research problems was to keep on the same trajectory that has led to the mindfulness crisis. As Dimidijan and Segal described, without filling the knowledge gaps in mindfulness research, the continued publication of preliminary, methodologically limited studies would have relatively low scientific value.[5] This is a point that has been repeatedly made in critical studies for several decades. However, there have been many attempts to make sense of mindfulness from theoretical and methodological perspectives. The frequency of papers that proposed theoretical frameworks and proscriptive agendas for mindfulness research after 2005 demonstrates the depth of scientific uncertainty.

Without reliable experiments, even at a preliminary stage, how could results be described as 'promising', and what does promising mean in a scientific context anyway? Scientists have occasionally excused the lack of progress in defining and validating mindfulness as the normal progression of science, arguing that new knowledge and new paradigms take considerable time and effort to establish. However, there are issues with this mitigation. Firstly, the scale of the project to medicalise meditation was vast. Since 1970, over thirty thousand meditation studies have been published. If this level of effort represents 'early-stage', what would be required to lift scientific understanding to a mature level? From this perspective, science creation appears to be mediated by a wide range of forces, including media interest, social policy and the agency and possibly beliefs of scientists and institutions.

[5] Dimidjian and Segal, p. 593.

Most data gathered in mindfulness research was linked to subjective self-report measures. However, the increased attention to neuroscientific investigations after 2010 added more objective data to the scientific understanding of mindfulness's effects on brain function and structure. Some of the limitations seen in the MBSR paradigm were relocated to these more mechanistic mindfulness investigations. Similar methodological criticisms of psychological and neuropsychological studies indicate common challenges of investigating meditation and that a 'mindfulness research culture' was adopted by scientists working in different disciplines.

8. Social and Health Policy

Taken at face value, the results of preliminary mindfulness experiments inevitably attracted the interest of health policy. If a small percentage of the peer-reviewed claims made for the benefits of mindfulness had been converted to effective treatments, MBIs would have transformed public health globally. Interventions listed by Baer in her 2003 clinical review of mindfulness alone included potential therapies for chronic pain, binge eating, depression, anxiety, fibromyalgia, psoriasis, cancer and the use of mindfulness for several psychological conditions. However, of these, only MBCT experiments had approached robust scientific validation. The possible applications for mindfulness grew exponentially after the dramatic post-2003 growth in research. The 2004 approval of MBCT by NICE for use in the treatment of depression in the NHS was considered by some as proof of the mindfulness concept more generally. However, despite the methodological improvements compared to earlier studies, MBCT research did not demonstrate causality between the intervention and the positive health outcomes seen in the trials. The NICE endorsement implied a high level of scientific validation, so unsurprisingly, MBCT was a foundation of the MAPPG 2015 investigation into the benefits of mindfulness.

The *Mindful Nation* report described and praised mindfulness's deployment and encouraged further proliferation. The review stressed the scientific reliability of MBCT and advocated its increased use. However, little attention was paid to the limitations of MBCT research in the report. More generally, *Mindful Nation* reflected the trend of evaluating the scientific progress of mindfulness using preliminary, unreplicated studies and largely ignoring authoritative strategic reviews.

The brief description in *Mindful Nation* of the relationship between 'mental capital' economic performance and the deployment of mindfulness in schools is worthy of further research and wider discussion. A preliminary study indicated that mindfulness training could increase resilience in the workforce (mental capital), supporting productivity and creativity, thereby improving the UK's future economic prospects. On this basis, growing mindfulness practice in schools was recommended. The potential use of mindfulness as a mind-training tool to support social and economic policy was a radical departure from exploiting Buddhist meditation as a health intervention. It may, in part, explain the social policy and political enthusiasm for mindfulness. There is no strong evidential basis to presume that teaching children mindfulness would be able to boost the UK economy in the long term. In this way, *Mindful Nation* offers insights into the risks of using preliminary scientific insights to support health and social policy.

9. Mind the Hype: From Paradox to Crisis

The publication of *Mindful Nation* in 2015 represented a high point in the enthusiasm for and presumed potential of mindfulness. The NHS was prescribing MBCT, UK politicians were urging increased use of mindfulness across society, and there was a production line of research proposing new applications almost every week. However, the concerns of some

scientists also grew, which led to a dramatic change in the tone of criticism. Creswell's 2017 review claimed a degree of 'fanaticism' from mindfulness advocates.[6] In 2018, Van Dam and others warned of harm to consumers due to the hyping of low-quality research. The failure to correct or even acknowledge the paradox in some quarters resulted in a crisis in mindfulness research. These critical reviews represented a major challenge to the paradox and were a turning point in the promising but unproven acceptance of mindfulness research and practice. Over the last five years, more critical studies and large-scale RCTs have been published and discussed in the print media (see the Postscript below). However, despite this shift, there are signs that the paradox is far from resolved or universally acknowledged within scientific and clinical communities.

10. Solutions and Future Directions

A key goal of this thesis has been to avoid repeating the dualistic limitations from which MBSR emerged, supporting one position over another. For example, to champion the scientific over the spiritual or the medicalised over the traditional. An issue presented in this thesis is that a paradox led to conflicting claims about the benefits of practising mindfulness. This conflict was sustained by maintaining the views in the scientific literature that mindfulness interventions were and were not scientifically validated. Without resolving this confusion, the full health potential of mindfulness and other meditation technologies will remain largely undiscovered and undervalued. The cause of the crisis in mindfulness research was the realisation that the paradox had real-world consequences, that promoting health and wellbeing interventions ahead of robust scientific validation might lead to negative outcomes on several different levels. As such, tweaking methodological approaches alone will not deliver the full

[6] Creswell, p. 509.

benefits of meditation technologies. There is, therefore, a pressing need to establish a scientifically validated theoretical framework(s) for meditation research in general and mindfulness in particular.

Given the widespread acceptance of MBIs, it may be several years before a consensus surrounding mindfulness research and practice emerges. The influence of medicalisation is at many different levels in society, and investment in the mindfulness concept by governments, institutions, and individuals will make reforming the narrative challenging. Unless stakeholders recognise the historical limitations in mindfulness research and practice, greater fragmentation of insights and, thus, increased misunderstandings are possible. I recommend establishing an authoritative overview of mindfulness research and practice to acknowledge and address the known limitations. Then, the paradox has to be resolved, and the lingering uncertainty of the bridging hypothesis must be removed. This would allow the body of mindfulness research that follows traditional scientific approaches to reflect best practices in the field. A separate strand of objective research of traditional meditation practices could also continue on a more stable footing. A potential 'third way' of the integration of Eastern spiritual knowledge and Western scientific understanding is still possible, but it will require completely new ontological and epistemological frameworks. Medicalised mindfulness does not coherently reflect traditional multiple Buddhist meditation practices. So, a great deal of transdisciplinary research is necessary to scientifically establish what mindfulness meditation is in non-scientific knowledge systems.

As already discussed, it is possible that the mindfulness paradigm may have been influenced by a rejection of traditional medico-scientific approaches, such as the RCT. However, even if this behaviour can be proven, the same problems will remain for psychological sciences: how do we know what mindfulness is, how does it work, and how can we measure its effects? A key challenge for the contemplative science community is a cultural

shift to a more stable understanding of what constitutes scientific validation. Alongside introducing testable hypotheses, a consensus regarding acceptable theoretical and methodological standards in experiments is essential. If the paradox remains unresolved, there is a real possibility that the perceived value of the psychological sciences and the clinical benefits of meditation will be reduced.

The thorny issue of ontological conflict between distinct knowledge systems requires a major revaluation. Well-conducted experiments can observe the effects of meditation behaviours. However, this history has demonstrated limitations in how scientists and scholars understand religious knowledge and its relationship with science. Greater caution must be exercised at the intersections of scientific and non-scientific knowledge. Psychology may not currently have the epistemological sophistication to evaluate non-scientific knowledge reliably. It may be necessary to revise the perception of traditional and nativist knowledge, from East and West, in scientific and scholarly literature. If scientists wish to understand spiritual practices' rationales and their underlying cognitive processes, new and flexible approaches have to be developed. Translating nondual Eastern religious insights to scientific settings can reduce complex spiritual knowledge into scientific terms distant from the original concepts. Using the development of mindfulness as a case study, it appears that some scientists were unaware that an ontological/epistemological conflict was possible, let alone probable when incongruent knowledge systems were bridged or integrated. This conceptual limitation is likely caused because of the effects of incommensurability and other cognitive processes. Establishing clear boundaries between medicalised and traditional medico-scientific approaches will improve short- and long-term mindfulness research. In short, scientists need to specify the boundaries between what they know and what they believe when dealing with 'grey' areas of investigation. From the perspective of the substantial body of critical literature, a review of the promotion of mindfulness by health and social policy agents for use in schools

and other areas of society is recommended. The potential for unwanted UAEs in mind training methods, such as the use of mindfulness by young people, patients and vulnerable populations, should be reconsidered. Changes to the understanding and scientific reception of mindfulness research since 2000 require a review of earlier foundational studies. The practice of founding new mindfulness research on unreplicated preliminary or pilot investigations should be discouraged until greater clarity regarding the reliability of those earlier studies is established. Clearer guidance is needed for scientists on what constitutes scientific validation in the contemplative sciences. Finally, further research should be largely concentrated on providing greater scientific validation in the most scientifically promising areas of mindfulness research and practice.

11. Postscript: Mindfulness Research Since 2020

Although this thesis reviews the scientific history of meditation between 1938 and 2020, for completeness, a popular science article from 2021 and a newspaper review of one of the largest mindfulness studies published to date from 2022 are discussed in this postscript. Driven partly by growing uncertainty about the scientific claims underpinning the mindfulness revolution, *New Scientist* published 'A clear-headed look at the evidence' in June 2021.[7] (Figure 18) Jo Marchant's investigation was journalistic, contrasting opposing opinions from the scientific community. The article offered a compromise that mindfulness was often useful, but its benefits were frequently no greater than other interventions.

As this article lacked a historical perspective, this investigation failed to describe the development of mindfulness over the previous forty years. It did not explain mindfulness's

[7] Jo Marchant, 'The Mindfulness Revolution: A Clear-Headed Look at the Evidence', *New Scientist*, 2021 <https://www.newscientist.com/article/mg25033370-300-the-mindfulness-revolution-a-clear-headed-look-at-the-evidence/> [accessed 23 December 2022].

perennial promising but not proven status. The purpose of highlighting Marchant's article is that it brought more balance into the public conversation about mindfulness, which Van Dam and others had called for in MtH.[8]

Fig. 18. The headline from New Scientist's review of the evidence supporting the mindfulness revolution.

Secondly, Marchant also reported a problematic claim made by Kieran Fox, a Stanford University neuroscientist, that the mindfulness concept was still poorly understood: 'Another challenge is that we still don't have a good scientific definition of what mindfulness really is, or rigorous ways to measure the extent to which people are in a mindful state.'[9] If Fox's claims are confirmed, they support this thesis's overarching conclusion of a pressing need for a major revaluation of mindfulness research and practice. Fox's warnings are part of an established and enduring narrative built up by leading researchers since the 1970s. Still, no major shift in mindfulness policy and practice to address the paradox is visible. Understanding complex

[8] Van Dam and others.
[9] Marchant.

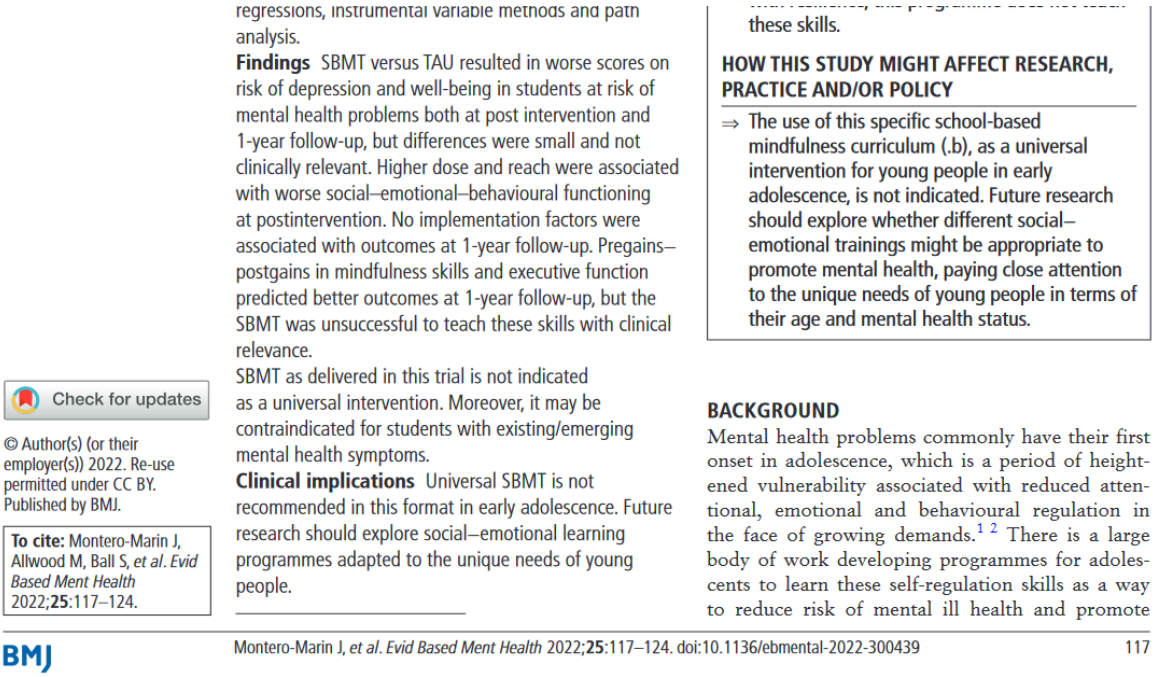
mental processes is far from simple and may require a considerable collective research effort. However, the value of producing tens of thousands of preliminary, pragmatic, and methodologically limited mindfulness studies remains unclear, but it nonetheless continues.

On the 12th of July 2022, *The Guardian* reported on the final stage of a major study into the benefits of School-Based Mindfulness Training (SBMT).[10] The 'My Resilience in Adolescence (MYRIAD)' trial sought to establish if SBMT worked among young adults and, if so, for whom. This article further confirmed that the media was reporting the results of mindfulness research more realistically. *The Guardian* headline: 'Mindfulness in schools does not improve mental health, study finds', made a clear statement about the research findings. The MYRIAD study was a parallel-group, cluster-randomised controlled trial with 8376 students aged 11–13 from 84 secondary schools.[11] This investigation was of the size and methodological reliability mindfulness reviews had been calling for, for many years. (Figure 19) The scientists found that SBMT was not beneficial across the chosen population and may have even caused UAE in some students: 'SBMT as delivered in this trial is not indicated as a universal intervention. Moreover, it may be contraindicated for students with existing/emerging mental health symptoms.'[12] These results challenged the use of SBMT in the trial conditions and are more generally problematic for mindfulness's reputation.

A response by Mark Williams to the findings published in the report illustrates the challenge of moving the mindfulness conversation into new, more productive scientific areas. Williams, one of the co-authors of the 2000 MBCT study, offered an explanatory mitigation for the negative results:

[10] Sally Weale, 'Mindfulness in Schools Does Not Improve Mental Health, Study Finds', *The Guardian*, 12 July 2022, section Society <https://www.theguardian.com/society/2022/jul/12/mindfulness-schools-does-not-improve-mental-health-study> [accessed 23 December 2022].
[11] Montero-Marin and others.
[12] Montero-Marin and others. p. 117.

"They also show that the idea of mindfulness doesn't help – it's the practice that matters." Those students that did engage improved, he said, but most did not. "On average they only practised once over 10 weeks of the course. And that's like going to the gym once and hoping you'll get fit. But why didn't they practise? Well, because many of them found it boring."[13]



regressions, instrumental variable methods and path analysis.

Findings SBMT versus TAU resulted in worse scores on risk of depression and well-being in students at risk of mental health problems both at post intervention and 1-year follow-up, but differences were small and not clinically relevant. Higher dose and reach were associated with worse social–emotional–behavioural functioning at postintervention. No implementation factors were associated with outcomes at 1-year follow-up. Pregains–postgains in mindfulness skills and executive function predicted better outcomes at 1-year follow-up, but the SBMT was unsuccessful to teach these skills with clinical relevance.

SBMT as delivered in this trial is not indicated as a universal intervention. Moreover, it may be contraindicated for students with existing/emerging mental health symptoms.

Clinical implications Universal SBMT is not recommended in this format in early adolescence. Future research should explore social–emotional learning programmes adapted to the unique needs of young people.

these skills.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE AND/OR POLICY

⇒ The use of this specific school-based mindfulness curriculum (.b), as a universal intervention for young people in early adolescence, is not indicated. Future research should explore whether different social–emotional trainings might be appropriate to promote mental health, paying close attention to the unique needs of young people in terms of their age and mental health status.

Check for updates

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BACKGROUND

Mental health problems commonly have their first onset in adolescence, which is a period of heightened vulnerability associated with reduced attentional, emotional and behavioural regulation in the face of growing demands.[1 2] There is a large body of work developing programmes for adolescents to learn these self-regulation skills as a way to reduce risk of mental ill health and promote

Fig. 19. The findings and clinical implications from the 2022 MYRIAD study.[14]

Williams makes a fair point, but he also draws us back to the idea that the benefits of mindfulness are promising but not proven and that the value for the general population is still elusive. He argues for the need to add another layer to mindfulness research. However, the mindfulness revolution was based on decades of experiments in which participant training was frequently 'homework', which was unobserved by scientists. This realisation, that some

[13] Weale.
[14] Montero-Marin and others. p. 117.

participants find mindfulness boring raises questions about the value of unevidenced mindfulness practice recorded in previous experiments. It should also be of concern that mindfulness, in certain conditions, generated UAEs. Although this is only one study, its size and methodological reliability lend authority to its findings. The outcomes of the investigation were not wholly negative; some sub-groups, such as teachers, did appear to gain benefit from the intervention. Experiments on this scale can only help establish scientific certainty regarding the potential of MBIs. However, these two articles and the reactions of leading mindfulness scientists indicate that removing the paradox will take considerable time and require more than experimental evidence or informed scientific opinion. However, by becoming a major area of scientific interest, mindfulness also influences the direction of psychology and how it understands and treats health and wellbeing. The history of medicalised mindfulness reminds us that major scientific projects can emerge from social change, be nurtured by multiple non-scientific stakeholders, and reflect the wider society in which it is situated.

Science, like meditation, changes over time; this thesis has demonstrated how medicalised mindfulness's stakeholders both attempted to conform to and yet also reject some of the 'norms' of science creation. In answering the main research questions of how and why mindfulness became a major object of research and the application of that research thrived despite the presence of the paradox, new issues and questions have been highlighted. From a historical perspective, it appears that there was little ability to challenge or govern the claims being made for mindfulness in peer-reviewed research once it gained momentum. Try as they might, scientists who demonstrated the obvious limitations in meditation and mindfulness research appeared to have limited impact on the progress of the mindfulness revolution until 2015. But by this point, mindfulness had been integrated into health and social policy, and the narrative that it was a scientifically validated low-cost panacea was well established. This issue raises the enduring and problematic issue of how science is regulated. As a case study, this

scientific history illustrates that scientific investigations are so complex that relying on the scientific method alone to create 'reliable' science is unrealistic. In addition, the presumption that the work of scientists is objective and not subject to conscious and sub-conscious bias is a naive presumption. Future researchers might find significant value in investigating the notion of 'reliable science' in different populations to understand the areas of misunderstanding in the role and practice of science in society.

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Appendix A: Proliferation of Mindfulness Research: 1985 to 1990

The attempts to widen interest in and application of MBSR are demonstrated by the range of material published between 1985 and 1990.

Year	Authors	Title	Media
1985	Jon Kabat-Zinn, Leslie Lipworth, and Robert Burney.	“The clinical use of mindfulness meditation for the self-regulation of chronic pain.”	Journal of behavioral medicine 8, no. 2 (1985): 163-190.
1985	Kabat-Zinn, J., B. Beall, and J. Rippe.	"A systematic mental training program based on mindfulness meditation to optimize performance in collegiate and Olympic rowers."	Poster presented at the World Congress in Sport Psychology, Copenhagen, Denmark.
1986	Kabat-Zinn, Jon, Leslie Lipworth, R. Burney, and William Sellers.	“Four-year follow-up of a meditation-based program for the self-regulation of chronic pain: treatment outcomes and compliance."	The Clinical Journal of Pain 2, no. 3 (1986): 159-774.
1986	Rippe, J.M., Southmayd, W., Pappas, A., Clark, N. and Kabat-Zinn, J.,	“The sports performance factors”	Book (Perigee Books, New York).
1986	Kabat-Zinn, J., Sellers, W. and Santorelli, S.,	“Symptom reduction in medical patients following stress management training., Chicago. Nov. 15. Unpublished study.”	Poster presented at AABT Meeting
1986	Kabat-Zinn, J., Goleman, D. and Chapman-Waldrop, A.,	“Relationship of cognitive and somatic components of anxiety and depression to patient preference for alternative relaxation techniques.”	A poster presented at the 7th annual meeting of the Society of Behavioral Medicine, San Francisco (March 1986)
1987	Kabat-Zinn, Jon, L. Lipworth, R. Burney, and W. Sellers.	Erratum - "Four-year follow-up of a meditation-based program for the self-regulation of chronic pain: Treatment outcomes and compliance."	The Clinical Journal of Pain 3, no. 1 (1987): 60
1988	Kabat-Zinn, Jon, and Ann Chapman-Waldrop.	"Compliance with an outpatient stress reduction program: Rates and predictors of program completion."	Journal of behavioral medicine 11, no. 4 (1988): 333-352.
1988	Ockene, Judith K., Glorian Sorensen, Jon Kabat-Zinn, Ira S. Ockene, and Gary Donnelly.	"Benefits and costs of lifestyle change to reduce risk of chronic disease."	Preventive medicine 17, no. 2 (1988): 224-234.

1988	Bernhard, J. D., Jean Kristeller, and Jon Kabat-Zinn.	"Effectiveness of relaxation and visualization techniques as an adjunct to phototherapy and photochemotherapy of psoriasis."	Journal of the American Academy of Dermatology 19, no. 3 (1988): 572-574.
1989	Kabat-Zinn, J., Skillings, A. and Santorelli, S.F	“Sense of coherence and stress hardiness as predictors and measure of outcome of a stress reduction program.”	Poster presented at the Society of Behavioral Medicine conference, San Francisco (March. 1989).
1990	Ockene, Judith K., Ira S. Ockene, Jon Kabat-Zinn, Harry L. Greene, and David Frid.	"Teaching risk-factor counseling skills to medical students, house staff, and fellows."	American journal of preventive medicine 6, no. 2 Suppl (1990): 35-42.
1990	Kabat-Zinn, Jon.	*Full catastrophe living: The program of the stress reduction clinic at the University of Massachusetts Medical Center.*	Book (New York, Bantam)
1990	Weinberger, J., McLeod, C., McClelland, D., Santorelli, S.F. and Kabat-Zinn, J.,	“Motivational change following a meditation-based stress reduction program for medical outpatients.”	Poster presented at the First International Congress of Behavioral Medicine, Uppsala, Sweden (June, 1990).
1990	Kabat-Zinn, J.	“Breathing lessons; Would a Day Devoted to Meditation Help Patients Stand up to Stress.”	Health, 22, pp.46-47.