

Kotherová, Silvie

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What Do We Really Know about Buddhist Meditation Research? Controversies and Problems Surrounding the Study of Buddhist Meditation

SILVIE KOTHEROVÁ

Department of Sociology, Andragogy and Cultural Anthropology, Faculty of Arts, Palacký University Olomouc, Olomouc, Czechia • silvie.kotherova@upol.cz • ORCID 0000-0001-7952-7697

ABSTRACT

Buddhist meditations have become a prominent subject in modern science, often approached with respect and reverence. However, this study reveals controversial aspects of research on Buddhist meditations, which lead to a uniform portrayal of these practices as a panacea. The study reveals the historical background of Buddhist meditation research and points out where the overly positive image of Buddhist meditations, lacking reporting on their side effects, comes from. It focuses on engaged scientists associated with the mindfulness movement and the Mind and Life Institute, which are creating a new missionary effort to promote religious interests through a scientific framework. The rise of positive psychology and the influence of social media also play a crucial role in perpetuating this idealized image. Consequently, the article sheds light on the current dynamics between science and Buddhism, in which scientific inquiry investigates Buddhism, while Buddhism also utilizes science to advance its interests.

Keywords: meditation; Buddhist meditation; meditation research; western Buddhism, Buddhism and science

Introduction

Research on Buddhist meditations has become a critical area of human health research and, along with it, an essential topic in the cognitive science of religion. For example, Buddhist-derived meditation-practice treatment programs such as



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“mindfulness-based interventions” (MBIs) are being applied to the full range of ailments, including psychiatric disorders,¹ chronic pain,² and stress³ emotion regulation.⁴ These programs have also been utilized to enhance cognitive abilities.⁵ Thus, with over 250 mindfulness phone apps⁶ available, mindfulness has emerged as a leading contributor to the billion-dollar meditation industry⁷ and is used by more than 18 million meditators⁸.

As a result, Buddhist meditation has become a prominent subject in modern science, often approached with respect and reverence. However, this study aims to highlight the more controversial aspects of research on Buddhist meditations, which can lead to a uniform portrayal of these practices as a universally beneficial tool for maintaining mental and physical health.

Behind these controversies are historical processes that have led to the interconnection between science and meditation, primarily documented by scholars in Buddhist Studies.⁹ This study aims to outline, within a historical context, the

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- 1 Alberto Chiesa and Alessandro Serretti, “Mindfulness Based Cognitive Therapy for Psychiatric Disorders: A Systematic Review and Meta-Analysis,” *Psychiatry Research* 187, no. 3 (2011): 441–53.
 - 2 Alberto Chiesa and Alessandro Serretti, “Mindfulness-Based Interventions for Chronic Pain: A Systematic Review of the Evidence,” *The Journal of Alternative and Complementary Medicine* 17, no. 1 (2011): 83–93.
Joshua A. Grant, “Meditative Analgesia: The Current State of the Field,” *Annals of the New York Academy of Sciences* 1307, no. 1 (January 2014): 55–63.
 - 3 Madhav Goyal et al., “Meditation Programs for Psychological Stress and Well-Being: A Systematic Review and Meta-Analysis,” *JAMA Internal Medicine* 174, no. 3 (2014): 357.
 - 4 Richard Chambers et al., “Mindful Emotion Regulation: An Integrative Review,” *Clinical Psychology Review* 29, no. 6 (2009): 560–72.
 - 5 Alberto Chiesa et al., “Does Mindfulness Training Improve Cognitive Abilities? A Systematic Review of Neuropsychological Findings,” *Clinical Psychology Review* 31, no. 3 (2011): 449–64.
 - 6 “Mindfulness – Android Apps on Google Play,” accessed February 19, 2025, <https://play.google.com/store/search?q=mindfulness&c=apps&hl=en>.
 - 7 Jen Wieczner, “Meditation Has Become Big Business,” *Fortune*, March 12, 2016, <https://fortune.com/2016/03/12/meditation-mindfulness-apps/>.
This phenomenon extends beyond just meditation and mindfulness; it also applies to various spiritual practices that have become popular in the West. See the critique of the “spiritual supermarket” in Jeremy Carrette and Richard King, *Selling Spirituality: The Silent Takeover of Religion* (Routledge, 2005).
 - 8 Tainya C. Clarke et al., “Trends in the Use of Complementary Health Approaches Among Adults: United States, 2002–2012,” *National Health Statistics Reports*, no. 79 (10 February 2015): 1–16.
 - 9 Donald S. Lopez Jr., *Buddhism and Science: A Guide for the Perplexed* (University of Chicago Press, 2009); David McMahan, “Buddhism as the ‘Religion of Science’: From Colonial Ceylon to the Laboratories of Harvard,” in *Handbook of Religion and the Authority of Science Leiden*, ed. Jim R. Lewis and Olav Hammer (Brill, 2011); Donald S. Lopez Jr., *The Scientific Buddha: His Short and Happy Life* (Yale University Press, 2012).

exclusivity of certain Buddhist groups, their missionary strategies, and political advocacy. These factors have significantly impacted the experimental designs of meditation research studies, which in turn have influenced the medical milieu and the search for modern healthy lifestyles.

Additionally, the study will address questions such as: Why is research on Buddhist meditation primarily presented in a positive light? Furthermore, why does this research often neglect to report on the adverse effects of meditation techniques?

A Brief Historical Background

The issue of current experimental research into meditation is closely linked to the modern Euro-American perception of Buddhism and the historical position of Buddhism in the West. During the colonial period, linguistic interests significantly shaped the understanding of Buddhism, primarily through textual sources and their translations. The images of Buddhism and Buddhist meditation in the West have been shaped not only by colonialism but also by Christian missions, empiricism, Protestantism, and, not least, cultural pluralism.¹⁰ Over time, this has led to the formation of a new image of Buddhism that largely *overlooks its lived experiences and diversity*.¹¹

However, the colonial image of Buddhism did not take root only in the West but also in colonized countries. Mission schools created a new educational system in colonial countries, resulting in English-speaking middle-class students who became, to some extent, “uprooted” in their tradition. Buddhism evolved as a way for this class to assert its identity, leading to a new, distinct “urban” form that differed from the traditional “village” form. The study of Buddhist teachings and texts increasingly *involved the lay “secular” community* associated with various societies independent of temples and monastic institutions.¹² These societies trained a generation of “native” leaders¹³ who later played a crucial role in reshaping the perception of Buddhism in the West.

These changes culminated in the “Protest Buddhist Revival Movement” in the 20th century.¹⁴ This movement fully implemented Western ideas emphasizing

10 Stephen C. Berkwitz, *Buddhism in World Cultures: Comparative Perspectives* (ABC-CLIO, 2006).

11 Ellen Goldberg, “Buddhism in the West. Transplantation and innovation,” in *Buddhism in world cultures. Comparative perspectives*, ed. Stephen C. Berkwitz (ABC-Clio, 2006), 286–87.

12 Eg. The Pali Text Society founded by T. W. Rhys Davids, The Buddhist Theosophical Society founded by C. H. Olcott and H. P. Blavatsky. Berkwitz, *Buddhism in World Cultures*, 48.

13 Eg. Anagarika Dharmapala (1864–1933) and Krishnamurti (1895–1986).

14 Robert H. Sharf, “Buddhist Modernism and the Rhetoric of Meditative Experience,” *Numen* 42, no. 3 (1995): 241.

new aspects of Buddhism, such as individualism, a rational or “instrumental” approach to Buddhist teachings and practices, the rejection of the authority of clergy, renewed interest in the scriptural legacy, the repudiation of “supernatural” or “magical” aspects of Buddhism, the rejection of “empty” rituals, and the insistence on viewing Buddhism as a “philosophy” rather than a “religion”.¹⁵

Buddhist apologists crucially contributed to the acceptance of Buddhism only as a “religious experience” empty of ritual context, collaborating with Western groups like the Pali Text Society and the Buddhist Theosophical Society.¹⁶ By focusing on religious experience, Buddhism came to be seen as an ancient form of Eastern psychology, leading to the “*psychologization*” of *meditation practices*.¹⁷

Prominent figures in modern Buddhism, such as Daisetsu Teitaro Suzuki, have stated that Buddhism is both rational and empirical, suggesting its relevance to contemporary psychological research.¹⁸ His pro-Western orientation resulted in notable reinterpretations of Zen Buddhism. His presentation of many aspects of the Zen experience to his American students is essentially a Japanese interpretation of Christian mysticism, which his captivated listeners often fail to recognize beneath its Oriental surface.¹⁹

The interpretation of Buddhism as personal experience is exemplified by the meditation popularizer Thích Nhất Hạnh, who emphasised this approach in his writings for a non-Buddhist audience. His work reflects the influence of the Buddhist reform movement and contemporary European philosophy.²⁰ He later collaborated with key figures in the mindfulness movement who played a key role in meditation research.²¹

Buddhist teaching thus began to be perceived even as a full-fledged alternative to psychotherapy.²² Once understood as a religious ritual tied to specific doctrines, Buddhist meditation is now primarily explored as a technique for understanding the meditator’s mind. This interpretive shift has often led to problematic definitions and a lack of understanding of meditation in experimental studies.²³

15 Sharf, “Buddhist Modernism,” 252.

16 Berkwitz, *Buddhism in World Cultures*.

17 Sharf, “Buddhist Modernism,” 235.

18 Daisetsu Teitaro Suzuki, *Outlines of Mahayana Buddhism* (Schocken Books, 1963), 40.

19 Frédéric Lenoir, *Setkávání buddhismu se Západem* (Volvox Globator, 2002), 181.

20 Wynn Gadkar-Wilcox, “Thích nhất Hạnh’s Early Critiques of Enlightenment Rationality and Academic Buddhism, 1956–1961,” *Journal of Vietnamese Studies* 19, no. 1 (2024): 49–76.

21 Thich Nhat Hanh, “Mindfulness Makes Us Happy,” in *The Mindfulness Revolution: Leading Psychologists, Scientists, Artists, and Meditation Teachers on the Power of Mindfulness in Daily Life*, ed. B. Boyce (Shambhala Publications, 2011), 65–8.

22 Sharf, “Buddhist Modernism,” 267.

23 Dilwar Hussain and Braj Bhushan, “Psychology of Meditation and Health: Present Status and Future Directions,” *International Journal of Psychology & Psychological Therapy* 10, no. 3 (2010): 439–51.

Meditation was treated as a ready-made package in research or therapy without its components being thoroughly investigated. Therefore, scientists used a before-and-after meditation design, observing meditation as a black box which potentially caused the effects. However, no one knew what might cause such effects because the studies did not provide clear causal inferences.²⁴ Furthermore, researchers failed to differentiate between the effects produced by meditation techniques—such as single-pointed attention—and the influence of Buddhist indoctrination that typically accompanies meditation practices.²⁵ Overall, the meaning of Buddhist meditation has transformed from a religious ritual designed to help practitioners escape the cycle of rebirth (*samsara*) into a secular model of meditation techniques seen as psychological tools for enhancing mental well-being.

Although this new image of Buddhism appears firmly established and has become a relatively dominant concept in the West, various movements and voices have emerged in recent years that seek to correct this portrayal and return it to its “original tracks”. In the spirit of post-global Buddhism, we hear the voices of Buddhist practitioners advocating for re-ethnicization, reclamation, and re-traditionalization²⁶ in response to the global concept of the meditation movement²⁷.

Which Buddhism Is Relevant and Which Is Not? The Mindfulness Movement

The pivotal moment was when a new understanding of Buddhism emerged in the West, especially in the USA. Buddhism was present in the United States with the arrival of the first waves of immigrants from China and Japan in the 19th century.²⁸ However, these so-called old Asian-American ethnic groups²⁹ were not of interest to the scientific community. The ethnical form of Buddhism in the USA was primarily overlooked by Western audiences because it did not align with their Euro-American, meditation-focused and spiritualized interpretation of Buddhism.³⁰

24 Hussain and Bhushan, “Psychology of Meditation,” 447.

25 Silvie Kotherová, “Problematika experimentálního výzkumu buddhistických meditací,” *Sociální Studia / Social Studies* 12, no. 4 (2015): 73–93.

26 Jørn Borup, “Who Owns Religion? Intersectionality, Identity Politics, and Cultural Appropriation in Postglobal Buddhism,” *Numen* 67, no. 2–3 (2020): 226–55.

27 Ronald Purser, *McMindfulness: How Mindfulness Became the New Capitalist Spirituality* (Repeater, 2019).

28 Richard H. Seager, “American Buddhism in the Making,” in *Westward Dharma: Buddhism Beyond Asia*, ed. Charles S. Prebish and Martin Baumann (University of California Press, 2002), 107.

29 E.g. the Jodo Shinshu Buddhist Churches of America (BCA), an organization founded in the nineteenth century.

30 Jørn Borup, “Easternization of the East? Zen and spirituality as distinct cultural narratives in Japan,” *Journal of Global Buddhism* 16, (2015): 70–93, 71.

The emergence of a new form of Buddhism was influenced by historical events and the general crisis facing Western society in the 1960s, particularly the identity crisis facing American society, exacerbated by the Vietnam War, as well as the violent students' protests against "bourgeois society" which erupted in France in 1968. As a result, American alternative culture began turning to the East in the early 1960s to adopt its spiritual values,³¹ which emphasized inner experience and self-realization (in contrast to societal success and prevailing cultural norms), a connection with the cosmos (as opposed to the exploitation of nature), and a union with gurus (as opposed to bureaucratic ordering).³² During this period, hundreds of American therapists went to India to enrich their psychoanalytic practices with psychosomatic techniques transmitted by Indian meditation teachers. No wonder, then, that many Indian gurus and Buddhist masters began travelling to the United States in the latter half of the 1960s. The Immigration Act of 1965 allowed a new wave of Asian immigrants, invited by the therapeutic centers that flourished on California's university campuses.³³ Thanks to these events, Western converts and innovative therapeutic centers gained significant control over the influx of Buddhism into the United States.

A notable connection between Buddhism and science from this period can be seen in the work of Jon Kabat-Zinn, who founded the Stress Reduction Clinic at the University of Massachusetts Medical Center in 1979. Kabat-Zinn presents Buddhist teachings not as a religion but as a set of consciousness techniques that promote awakening and psychosomatic healing. As Metcalf mentioned, he often "intentionally removes meditation from its Buddhist context, and combines it with psychological ideas..."³⁴

This therapeutic Buddhist group was then pivotal in further experimental research on Buddhist meditations. In other words, a new generation of researchers was born. They were not only scientists but, above all, practicing Buddhists of a new generation. This dual identity is especially prominent in the field of mindfulness research, where many researchers are both academics and practitioners of the meditation techniques they study.³⁵ Charles Prebish even likens

31 Ellen Goldberg, "Buddhism in the West: Transplantation and Innovation," in *Buddhism in World Cultures: Comparative Perspectives*, ed. Stephen C. Berkwitz (ABC-CLIO, 2006), 292.

32 Lenoir, *Setkávání buddhismu se Západem*, 193.

33 Lenoir, *Setkávání buddhismu se Západem*, 194.

34 Franz A. Metcalf, "The Encounter of Buddhism and Psychology," in *Westward Dharma: Buddhism Beyond Asia*, ed. Charles S. Prebish and Martin Baumann (University of California Press, 2002), 359.

35 Jeff Wilson, *Mindful America: The Mutual Transformation of Buddhist Meditation and American Culture* (Oxford University Press, 2014); William B. Parsons, "Psychoanalysis Meets Buddhism," in *Changing the Scientific Study of Religion: Beyond Freud? Theoretical, Empirical and Clinical Studies from Psychoanalytic Perspectives*, ed. Jacob A. Belzen (Springer Netherlands, 2009), 179–209.

these academics to *gantha-dhura* (scholar-monks) in the East.³⁶ A notable example of a Buddhist practicing academic is Richard Davidson, who discusses his own journey as a meditation practitioner in his book *The Emotional Life of Your Brain*.³⁷ He describes his “coming out of the closet” as a meditator and how this practice led to a “personal and scientific transformation.”³⁸ These “gantha-dhura academics” thus began to create what we might today call the modern mindfulness movement.³⁹ These researchers often display a relentless enthusiasm for their field of study. However, it is essential to recognize that their strong beliefs can pose a risk to the objectivity of their research and can lead to a tendency to report only positive outcomes while overlooking adverse or null findings.⁴⁰

The Case of Tibetan Buddhism

Tibetan Buddhism has a particular position in meditation research. The development of Tibetan Buddhism in America has a distinct history, primarily driven by the Chinese invasion of Tibet and the subsequent creation of a Tibetan diaspora community.⁴¹ As mentioned above, research on Buddhism primarily focuses on non-ritualized forms of meditation. An interesting question remains: how does Tibetan Buddhism, famous for its highly ritualized practices, align with this concept?

The explanation is simple. The folk aspect of Tibetan religion was largely left behind in occupied Tibet.⁴² Although there was an initial effort to preserve Tibetan traditions and identity during the early Tibetan diaspora in the West, it

36 The term *gantha-dura* refers to monks who emphasized the study of texts (also languages, grammar, history, logic, and medicine) over the practice. While this scholar-monk model is common in Asia, it is notably absent in the American Buddhist community. American Buddhism fulfills this role by lay quasi-monks, functioning as guides through whom one can deepen one’s understanding of the Dharma. More in Charles S. Prebish, *Luminous Passage: The Practice and Study of Buddhism in America* (University of California Press, 1999), 197–200.

37 Richard J. Davidson and Sharon Begley, *The Emotional Life of Your Brain: How Its Unique Patterns Affect the Way You Think, Feel, and Live, and How You Can Change Them* (Hudson Street Press, 2012).

38 Davidson and Begley, *The Emotional Life of Your Brain*, 177.

39 Robert H. Sharf, “Is Mindfulness Buddhist? (And Why It Matters),” *Transcultural Psychiatry* 52, no. 4 (2015): 478.

40 Jonathan R. Lindahl et al., “The Varieties of Contemplative Experience: A Mixed-Methods Study of Meditation-Related Challenges in Western Buddhists,” *PLoS ONE* 12, no. 5 (2017): 1–38.

41 Seager, “American Buddhism in the Making,” 111.

42 Nicolas Sihlé, “Buddhism in Tibet and Nepal: Vicissitudes of Traditions of Power and Merit,” in *Buddhism in World Cultures: Comparative Perspectives*, ed. Stephen C. Berkwitz (ABC-CLIO, 2006), 266–68.



was Tibetan Buddhism that experienced significant changes. The 14th Dalai Lama emerged as the leading representative of Buddhist modernism associated with these changes.⁴³

As Tibetan Buddhism acculturated in the West, it began to emphasize new elements to establish its presence, such as simple ethics, the universality of Buddhism, and the “scientific” aspects of the Buddhist understanding of the mind and the nature of reality.⁴⁴ Buddhist philosophy started to become connected with modern scientific theories and achievements, adapting openly to the Western context.⁴⁵ Similarly, important texts such as the *Kalachakra tantra* became associated with modern, lay, and universal discourses, even though they were initially secret esoteric writings that remain incomprehensible to an uninitiated audience.⁴⁶ As Ström writes, *Kalachakra tantra* is “a ‘cultural performance’ through which ‘Tibetan culture’ is presented and represented, but also transformed.”⁴⁷ Tibetan Buddhism, in the spirit of the Protestant Buddhist movement, gradually moved away from its ritual practice and leaned towards meditation as an individual experience.⁴⁸ Consequently, the debate between Buddhism and science became a central theme within the exile community. Tibetan Buddhist exiles gradually began to meet with scientists to build “gentle bridges”⁴⁹ with them from the 1980s, which helped Tibetan Buddhism to establish itself well in the West. However, these meetings were intended for scientists with an open mind, ideally those who were familiar with Buddhism.⁵⁰ This connection between sympathetic scientists and Tibetan Buddhist exiles culminated in establishing the Mind and Life Institute, founded under the patronage of the 14th Dalai Lama. The main goal of this institution is to “bridge science and contemplative wisdom to foster insight and inspire action toward flourishing.”⁵¹ This mission has since been supported by generous grants intended for scientists across a range of disciplines who were to investigate the human mind

43 Donald S. Lopez Jr., *Prisoners of Shangri-La: Tibetan Buddhism and the West* (University of Chicago Press, 1998), 185.

44 Sihlé, “Buddhism in Tibet and Nepal,” 269.

45 Dalai Lama, *The Universe in a Single Atom: The Convergence of Science and Spirituality* (Harmony, 2005).

46 Lenoir, *Setkávání buddhismu se Západem*, 242.

47 Axel Kristian Ström, *The Quest for Grace: Identification and Cultural Continuity in the Tibetan Diaspora* (University of Oslo, 1995), 171–212.

48 Sharf, “Buddhist Modernism.”

49 Dalai Lama, Jeremy W. Hayward and Francisco J. Varela, *Gentle Bridges: Conversations with the Dalai Lama on the Sciences of Mind* (Shambhala Publications, 1992).

50 Daniel Goleman, *Destructive Emotions: A Scientific Dialogue with the Dalai Lama. How Can We Overcome Them?* (Bantam Dell, 2003), 379–85.

51 “About Mind & Life,” *Mind & Life Institute*, accessed January 20, 2025, <https://www.mindandlife.org/about/>.

and explore the psychological, physiological, behavioural, and social impacts of contemplative practices.⁵²

The Mind and Life Institute has actively supported research demonstrating the positive effects of Buddhist meditation across various fields of study. Thus, grantees become part of “a growing global movement of conscious social change as grassroots visionaries,” says Krista Weih, director of Mind and Life grants and events.⁵³ This support has significantly assisted in the favorable perception of Buddhism in the West. However, the Institute’s role goes beyond merely funding research;⁵⁴ it also offers summer training programs for scientists to equip them with “emerging methods and best practices, examine future opportunities and challenges within contemplative science”.⁵⁵ This situation illustrates a “leakage” of Buddhism into the realm of science, raising concerns about a potential missionary effort to promote religious interests through a scientific framework. Consequently, the research conducted by this group of scientists raises questions about its objectivity. As Geertz notes, it may be “more an expression of wishful thinking than of experimental results”.⁵⁶

The issues surrounding this group were crystallized in 2005 when 568 neuroscientists expressed their objections to a lecture that the Dalai Lama was to give at the annual meeting of the Society for Neuroscience (SfN) on November 12. The scientists argued that if research on meditation were to be conducted, it “should be on potential medical benefit—not promoting religion”⁵⁷. Armin W. Geertz aptly summarizes this dilemma by stating that “The Dalai Lama’s claim that Buddhism and neuroscience share the same philosophy and methodology exposes a startling ignorance of what science is all about. Neuroscientists who agree with this perspective should perhaps refresh their understanding of the philosophy of science.”⁵⁸

52 “Grants,” *Mind & Life Institute*, accessed January 23, 2025, <https://www.mindandlife.org/grants/>.

53 Krista Weih in Jane Hart, “Mind & Life Institute: Contemplative Changemaking Grants—Supporting Contemplative Practices for Social Change,” *Integrative and Complementary Therapies* 31, no. 1 (2025): 43–5.

54 As an example of Mind & Life Institute’s impact, we can state that in 2018, Mind & Life Institute offered three grant programs, awarding \$704,246 to fund 20 projects in 5 countries. *Mind & Life Institute*, “2018 Mind & Life Annual Report,” accessed July 2025, <http://media.mindandlife.org/email/2018-MindAndLife-AnnualReport-Web.pdf>.

55 “Summer Research Institute,” *Mind & Life Institute*, accessed January 21, 2025, <https://www.mindandlife.org/events/summer-research-institute/>.

56 Armin W. Geertz, “When Cognitive Scientists Become Religious, Science is in Trouble: On Neurotheology From a Philosophy of Science Perspective,” *Religion* 39, no. 4 (2009): 319–24, 322.

57 David Cyranoski, “Neuroscience Meeting Draws Fire Over Dalai Lama Lecture,” *Nat Med* 11, no. 1130 (2005).

58 Geertz, “When Cognitive Scientists,” 322.



Even though Tibetan Buddhism brought many good social intentions to the West,⁵⁹ it has also brought another controversial topic to the research on Buddhist meditations. Efforts to investigate the effects of meditation are largely burdened by the missionary efforts to spread Buddhism and the religious involvement of researchers.⁶⁰

Positive Meditation and Publication Bias

Not only the enthusiasm of Buddhist scholars for their subject and the efforts of Tibetan Buddhists to achieve successful integration into a society that recognizes science as an authority, but also publication bias may play an important role in the fact that meditation is now perceived mainly in a positive light.

Publication bias refers to the tendency to avoid publishing null results,⁶¹ which is a controversial issue that has significantly affected psychological research. This bias stems partly from the limitations of null hypothesis testing,⁶² where null results are often seen as difficult to interpret. This tendency creates a situation that limits the scientific assumption of replicability because replication cannot be meaningful without the potential recognition of failed replications. In a misguided attempt to demonstrate the successful replication of empirical findings and avoid replication failures, experimental psychologists may sometimes report an excessive number of positive results.⁶³

Publication bias often pressures researchers to report only positive results pre-

59 Projects often focused on important topics such as climate change, education, social inclusion, etc. In Hart, “Mind & Life Institute,” 43.

60 Some researchers awarded by the Mind & Life Institute grant in 2024 are Dilara Ally, who notes that “a two-decade Buddhist meditation practice has profoundly shaped her research,” see “Dilara Ally,” *Center for Mindfulness and Compassion*, accessed July 10, 2025, <https://www.chacmc.org/dilara-ally>; and Daniel Morris, who aims to “blend contemplative wisdom with modern science to unlock new insights into the mind”, see “Varela Grant: Integrating Tibetan Dream Yoga and Western Techniques for Lucid Dream Induction,” *Mind and Life Institute*, accessed July 10, 2025, <https://www.mindandlife.org/grant/integrating-tibetan-dream-yoga-and-western-techniques-for-lucid-dream-induction>.

61 Robert Rosenthal, “The file drawer problem and tolerance for null results,” *Psychological Bulletin* 86 (1979): 638–41.

62 Jacob Cohen, “The Earth is Round ($p < .05$),” *American Psychologist* 49 (1994): 997–1003. The tendency to avoid publishing null results can be motivated not only by trying to publish our results in the journal but also, for example, by pleasing our supervisor. More in: Michiel van Elk, “Replication and Open Science in the Psychology of Religion: Editorial to the Special Issue,” *The International Journal for the Psychology of Religion* 29, no. 4 (2019): 227–29.

63 Christopher J. Ferguson and Moritz Heene, “A Vast Graveyard of Undead Theories: Publication Bias and Psychological Science’s Aversion to the Null,” *Perspectives on Psychological Science* 7, no. 6 (2012): 555–61.

cisely to get their article published. For instance, if researchers encounter adverse effects of meditation in their studies, they may downplay these effects in their publications or choose not to report them. This leads to a distortion of data regarding the phenomenon under study – in our case, meditation. These tendencies are observable in meditation research if we look at the number of reported adverse effects of meditation since the 1970s. While most research reports the positive effects of meditation, only a handful of studies have reported adverse effects.⁶⁴ It wasn't until after the replication crisis in psychology⁶⁵ that there was an increase in the reporting of adverse effects associated with meditation.⁶⁶ This crisis opened the scientific field to more genuine discussions about zero or negative results through the practice of open science.⁶⁷ A significant role in promoting open science in religious studies is played by the Cognitive Science of Religion (CSR), which actively supports scientists in replicating research, especially in neuroscience, developmental psychology, and qualitative research.⁶⁸

Positive Psychology and Buddhist Meditations

The connection between Buddhist meditations and their positive perception has also been strengthened by their close connection with the field of positive

64 Sarah Lauricella, "The Ancient-Turned-New Concept of 'spiritual Hygiene': An Investigation of Media Coverage of Meditation from 1979 to 2014," *J Relig Health* 55 (2016): 1748–62; Silvie Kotherová et. al., "Adverse Effects of Meditation: Autonomic Nervous System Activation and Individual Nauseous Responses During Samadhi Meditation in the Czech Republic," *Journal of Religion and Health* 63, no. 6 (2024): 4840–60.

65 The replication crisis in psychology began with Daryl Bem's (2011) study, which claimed to demonstrate extrasensory perception. This study was repeatedly tested but failed to be replicated successfully. The failure of these replications triggered a debate about issues in psychological research, particularly concerning how we report, analyze, and selectively publish data. Consequently, many classic findings, as well as a growing number of recent studies published in prestigious journals, have undergone various replication attempts, exposing a significant problem with replicability in psychology. Daryl J. Bem, "Feeling The Future: Experimental Evidence for Anomalous Retroactive Influences on Cognition and Affect," *Journal of Personality and Social Psychology* 100 (2011): 407–25.

66 David Lambert et al., "Adverse Effects of Meditation: A Review of Observational, Experimental, and Case Studies," *Current Psychology* 42 (2023): 1112–25.

67 Frank Renkewitz and Heene Moritz, "The Replication Crisis and Open Science in Psychology: Methodological Challenges and Developments," *Zeitschrift Für Psychologie* 227, no. 4 (October 2019): 233–36.

Supporting publications with null results were significantly involved in the field of Religion Studies by journals such as *Religion, Brain & Behavior* and *Journal for the Cognitive Science of Religion*.

68 Suzanne Hoogeveen and Michiel van Elk, "Advancing the Cognitive Science of Religion Through Replication and Open Science," *Journal for the Cognitive Science of Religion* 6, no.1–2 (2021): 158–90.

psychology. Positive psychology arose in response to the fact that a large number of clinical psychologists often focus exclusively on negative psychological phenomena such as fear, anxiety, obsession, pain, depression, burnout, etc. The introduction of positive psychology aims to create a balance in psychologists' interests by addressing both the positive and negative aspects of life.⁶⁹

Positive psychologists focus on factors that contribute to happiness and subjective well-being. Key aspects include social connections with a partner, family, friends, and colleagues, as well as involvement in clubs or social organizations, physical exercise, but also meditation practices.⁷⁰ A notable figure in this field is Barbara L. Fredrickson, the recipient of the prestigious Templeton Positive Psychology Prize in 2000.⁷¹ She has dedicated much of her research to exploring different Buddhist meditations and presenting them as a positive practice. Although her work is not limited to mindfulness, a particularly popular practice linked to positive psychology is loving-kindness meditation (LKM), which she describes as a "cousin" to mindfulness meditation.⁷² Fredrickson characterizes this practice, found in Buddhism as *Mettā* (Pāli) or *Maitrī* (Sanskrit) meditation, as ancient and authentic, using it as it is conveyed in Buddhist texts.⁷³ Her research indicates that LKM can help to smooth social ups and downs across time,⁷⁴ alleviate negative symptoms, and enhance positive emotions and psychological recovery in individuals with schizophrenia.⁷⁵ Additionally, LKM has been shown to produce lasting increases in positive emotions, leading to greater life satisfaction and curbing depressive symptoms,⁷⁶ as well as increasing positive emotions and perceived positive social connections that improve cardiovascular health.⁷⁷

69 Alex P. Linley et al., "Positive Psychology: Past, Present, and (Possible) Future," *The Journal of Positive Psychology* 1, no. 1 (2006): 3–16.

70 Khan Duy L. Nguyen et al., "Loving-kindness meditation slows biological aging in novices: Evidence from a 12-week randomized controlled trial," *Psychoneuroendocrinology* 108 (2019): 20–7.

71 Linley et al., "Positive Psychology," 4.

72 Barbara L. Fredrickson, "Promoting Positive Affect," in *The Science of Subjective Well-Being*, ed. Michael Eid and Randy J. Larsen (The Guilford Press, 2008), 458.

73 Fredrickson, "Promoting Positive Affect."

74 Brian P. Don et al., "Training in Mindfulness or Loving-Kindness Meditation Is Associated with Lower Variability in Social Connectedness Across Time," *Mindfulness* 13, no. 5 (May 2022): 1173–84.

75 David P. Johnson et al., "A Pilot Study of Loving-Kindness Meditation for the Negative Symptoms of Schizophrenia," *Schizophrenia Research* 129, no. 2–3 (July 2011): 137–40.

76 Barbara L. Fredrickson et al., "Open Hearts Build Lives: Positive Emotions, Induced Through Loving-Kindness Meditation, Build Consequential Personal Resources," *Journal of Personality and Social Psychology* 95, no. 5 (2008): 1045–62.

77 Bethany E. Kok et al., "How Positive Emotions Build Physical Health: Perceived Positive Social Connections Account for the Upward Spiral Between Positive Emotions and Vagal Tone," *Psychological Science* 24, no. 7 (2013): 1123–32.

Nevertheless, these studies are not without their flaws. For example, a 2008 study aimed to demonstrate that loving-kindness meditation increases positive emotions in everyday life, leading to improvements in an individual's health. However, before the study began, the authors provided the participants with extensive information about meditation's positive effects on health and well-being.⁷⁸ Consequently, the observed effects may not have resulted from the meditation technique itself but rather from the participants being primed⁷⁹ with this information. Additionally, this prior information might have led participants to consciously alter their responses in the questionnaire, either to align with perceived expectations or to please the researchers. Conscious reflection may also lead the participant to respond positively, even if he did not feel better after the meditation condition, so as not to deviate from others "who certainly felt better" or to conform to what they believed was the desired outcome. There is also a possibility that participants could feel embarrassed if they perceived their weeks of meditation as ineffective. Such inconsistencies in research methods could significantly distort the results regarding the actual effects of meditation practice.

Another example of overly positive claims surrounding meditation comes from the publication titled "Loving-kindness Meditation Slows Biological Aging in Novices". While this title may garner significant attention, it is crucial to examine what the research actually discovered. The study measured telomere⁸⁰ length and its shortening under three conditions: Loving-kindness meditation (LKM), mindfulness meditation, and a control group. The results indicated that the LKM group, on average, exhibited no significant telomere shortening over time and experienced considerably less telomere shortening compared to the control group.

Although these findings are intriguing, it is important to note that the gradual shortening of telomere length may not necessarily correlate with aging,⁸¹ and,

78 Fredrickson et al., "Open Hearts Build Lives," 1051.

79 Priming is a concept in psychology and psycholinguistics to describe how exposure to one stimulus may influence a response to a subsequent stimulus, without conscious guidance or intention. More in John A. Bargh and Tanya L. Chartrand, "Studying the Mind in the Middle: A Practical Guide to Priming and Automaticity Research," in *Handbook of Research Methods in Social Psychology*, ed. Harry T. Reis and Charles M. Judd (Cambridge University Press, 2000), 253–85.

80 Telomeres are the end parts of chromosomes and act as expendable buffers that are gradually consumed during the process of cell division. Their presence protects genes; they are preferentially shortened instead of them, so genes emerge from the process undamaged. The gradual shortening of telomere length leads to cell aging. See Judith Campisi, "Senescent Cells, Tumor Suppression, and Organismal Aging: Good Citizens, Bad Neighbors," *Cell* 120, no. 4 (2005): 513–22.

81 James Coyne, "Telomere Hype: How to Debunk Claims about Telomeres and Aging," *Genetic Literacy Project* (blog), accessed January 14, 2015, <https://geneticliteracyproject.org/2015/01/14/the-telomere-hype-how-to-debunk-claims-about-telomeres-and-aging/>.



at the same time, does not indicate the length of people's life expectancy well.⁸² James Coyne also points out that telomere research is closely linked to the mindfulness movement and adds: "Strong efforts are made to attach the science of telomeres to urgings that we take up yoga, meditation, and 'being there' to save our lives."⁸³

In a similar vein is the research of Elissa Sarah Epel, who studies how psychosocial and behavioral factors, such as meditation and positive stress, can slow aging and focuses on climate wellness. She is greatly influenced by the mindfulness movement and collaborates with the Mind and Life Institute.⁸⁴ In one of her studies, this background leads her to conclude that a "highly wandering mind may indicate a more rapidly aging body,"⁸⁵ suggesting that meditation may play a crucial role in combating aging. I mention Epel not by accident; rather, I want to highlight the significant impact that certain individuals have on the perception of meditation research. Clarivate recently recognized Epel as being among one of the top 1% of researchers globally.⁸⁶

Thus, some prominent representatives of positive psychology, such as Barbara L. Fredrickson and Elissa S. Epel, are successfully continuing the trend started by John Kabat-Zinn and are providing positive "promotion" for Buddhist meditation through their research work.

The Media Bubble and "Meditation as a Panacea"

The portrayal in mainstream Western media has further amplified the reported positivity of Buddhist meditation.⁸⁷ Eklöf argues that contemporary scientists

82 Dana A. Gleib et al., "Predicting Survival from Telomere Length versus Conventional Predictors: A Multinational Population-Based Cohort Study," *PLOS ONE* 11, no. 4 (2016): e0152486.

83 Coyne, "Telomere Hype."

84 Mind & Life Podcast, "Elissa Epel – Mind, Body, and Stress," March 9, 2023, <https://podcast.mindandlife.org/elissa-epel/>.

85 Elissa S. Epel et al., "Wandering Minds and Aging Cells," *Clinical Psychological Science* 1, no. 1 (2013): 75–83.

86 "More than 30 Researchers Among Most Influential | UC San Francisco," accessed October 30, 2022, <https://www.ucsf.edu/news/2022/11/424341/more-30-researchers-among-most-influential>.

87 Anna Lutkajtis, "'The Answer to All Your Problems?' The Overly Positive Presentation of Meditation in the Media," *Journal for the Academic Study of Religion* 32, no. 1 (2019): 49–71. Farias and Wikholm identify seven myths about meditation. They then compare it to a pill: "like medication, meditation can produce changes in us both physiologically and psychologically, and that it can affect all of us differently. Like swallowing a pill, it can bring about unwanted or unexpected side-effects in some individuals." See more in Miguel Farias and Catherine Wikholm, *The Buddha Pill: Can Meditation Change You?* (Watkins Media Limited, 2019), 221.

can bypass traditional media channels by using personal websites and social networks to communicate information directly, thus avoiding the usual obstacles associated with professional communication with the mass media. Furthermore, she notes that over the past thirty years, science (in the form of scientific organizations and their members) has developed a closer relationship with the mass media and is more responsive to the priorities and needs of media organizations.⁸⁸

There are many methodological issues in meditation research,⁸⁹ and research articles often highlight the existence of knowledge gaps, poor methodological design, and the preliminary nature of their research findings. However, this level of uncertainty is not present to the same extent in more personalized popular science reports. Instead, they tend to emphasize the “revolutionary” and “cutting-edge” nature of meditation research.⁹⁰ An increasing number of websites, blog posts, and social media posts by scientists utilize meditation research to validate their own studies. They often highlight that their research was conducted in a “rigorous” scientific environment, such as a neuroscience laboratory. When discussing mindfulness meditation, the focus is not on its religious aspects but on the fact that mindfulness is grounded in scientific principles.⁹¹ This practice often leads to the oversimplification and incomplete reporting of meditation research findings. Specifically, there is a predominantly over-positive view of meditation effects, acting as a type of panacea and pathway to happiness, which ignores some of the potential adverse effects associated with meditation practice.⁹² Additionally, meditation is frequently reduced to the concept of mindfulness, which is closely linked to psychological and therapeutic practices.⁹³ This perspective permeates the media, where meditation is presented as a form of mental hygiene,⁹⁴ a pathway to happiness and a tranquil path associated with relaxation. When framed this way, meditation becomes associated with secular pragmatic purposes, such as improving health and wellness.⁹⁵

88 Jenny Eklöf, “Saving the World: Personalized Communication of Mindfulness Neuroscience,” in *Handbook of Mindfulness*, ed. Ronald E. Purser, David Forbes, and Adam Burke (Springer International Publishing, 2016), 323–35.

89 Nicholas T. Van Dam et al. “Mind the Hype: A Critical Evaluation and Prescriptive Agenda for Research on Mindfulness and Meditation,” *Perspectives on Psychological Science* 13, no. 1 (2018): 36–61.

90 Eklöf, “Saving the World,” 327.

91 Eklöf, “Saving the World.”

92 Lutkajtis, “‘The Answer to All Your Problems?’”

93 Sharf, “Is Mindfulness Buddhist?”

94 Anna Kelsey-Sugg and Bec Zajac, “‘Mental Hygiene’ Could Improve Your Life — But Does it Improve Your Health?” *ABC News*, October 17, 2018, <https://www.abc.net.au/news/2018-10-17/dan-siegel-on-distractions-and-mental-health-hygiene/10343984>.

95 Lutkajtis, “‘The Answer to All Your Problems?’”, 53–4.



Although research presented in this way attracts a wave of captivating headlines such as “proof that meditation CAN grow your brain: in just eight weeks it can improve learning and memory,”⁹⁶ they do not present the results as stated in the research articles. This controversial practice is currently facing resistance from the academic community, which is attempting to identify and counteract these unfair practices.⁹⁷ Then, there are other bizarre situations in which the authors of this catchy article try to explain this situation, such as the neuroscientist Richard Davidson, who says: “There was frankly a lot of hype . . . saying that if you meditated for eight weeks you could change the volume of your prefrontal cortex. That is false.” However, he does not forget to add, in the spirit of his dual Buddhist-scientific identity, that beneficial functional and behavioral changes due to meditation are likely to occur much faster.⁹⁸

At the same time, various movie and media stars heavily support the overly-positive portrayal of Buddhist meditation, which helps spread this narrative worldwide. In their view, meditation is presented as completely secular, free from religious elements. Celebrities often share stories in the spirit of a newspaper article’s narrative about the positive effects of meditation, highlighting its benefits for health, happiness, and even success. It is quite rare to find any mention of the adverse effects of meditation in these stories.⁹⁹

Controversies and Problems of Buddhist Meditation Research

If we take a closer look at research on Buddhist meditations, we find several problematic points associated with it.

Definition

One already encounters various problematic practices at the very beginning of the research, when the concept of meditation is defined. We can observe, for example, the boundless adoption of Buddhist terminology and religious concepts without researchers reflecting on the connection of these practices with Buddhist doctrinal frameworks.¹⁰⁰ The conversion of Buddhist concepts into

96 Stephen Adams, “Proof that meditation CAN grow your brain: In just eight weeks it can improve learning and memory,” *Daily Mail Online*, November 8, 2014, <https://www.dailymail.co.uk/health/article-2826953/Proof-meditation-grow-brain-just-eight-weeks-improve-learning-memory.html>.

97 Van Dam et al., “Mind the Hype.”; Lutkajtis, “‘The Answer to All Your Problems?’”

98 Natalia Mesa, “Eight Weeks of Meditation Doesn’t Change the Brain, Study Finds,” *The Scientist*, May 20, 2022, <https://www.the-scientist.com/eight-weeks-of-meditation-doesn-t-change-the-brain-study-finds-70042>

99 Lutkajtis, “‘The Answer to All Your Problems?’”, 57–8.

100 Kotherová, “Problematika experimentálního výzkumu.”

science was initially carried out by Buddhist scientists.¹⁰¹ Over time, these concepts became so well-established that they were adopted by other members of the scientific community, often without a thorough understanding of the original ideas. Some scientists utilize meditation techniques, such as Loving-Kindness Meditation (LKM), in the same way they are practiced in Buddhism without explaining why these practices should produce the intended effects. The primary argument for selecting these techniques is their apparent ancient origins.¹⁰² For instance, the research conducted by Lehman et al. showcased the variety of meditation techniques but failed to engage with the deeper meanings behind them. Instead, they offered a definition of meditation exercises simply as “those exercises which their respective tradition regards as the route to the most desirable meditative state.”¹⁰³ Van Dam et al. present a “list of Defining Features for Characterization of Meditation Practice,”¹⁰⁴ showing many definitional ambiguities. This issue is particularly relevant to current research on mindfulness meditation. Researchers often fail to inquire about the specific elements that make up the phenomenon of a given meditation, such as cognitive processes, cardiac activity, stimulation of the nervous system, suggestibility, and individual dispositions.¹⁰⁵ Due to this inadequate understanding of the phenomenon under study, even a widely-used term like “mindfulness” lacks a universally accepted technical definition in the scientific literature, as well as broad agreement on the detailed aspects of the underlying concepts it refers to.¹⁰⁶

When defining meditation, there is a tendency among scientists to homogenize the terminology used. As a result, researchers often fail to distinguish between the various meditation techniques that have emerged in the West, lumping them all together under the single term “meditation”. In scientific studies, it is common for researchers to refer to previous work by using phrases like “earlier meditation research showed XY,” or “there is a consensus in the liter-

101 Eg. Alan B. Wallace, “Vacuum States of Consciousness: A Tibetan Buddhist View,” in *Buddhist Thought and Applied Psychological Research: Transcending the Boundaries*, ed. Dharm P. K. Nauriyal, Michael S. Drummond, and Yogacharya B. Lal (Routledge, 2006), 112–21.

102 Fredrickson, “Promoting positive affect,” 458.

103 Dietrich Wallace et al., “Reduced Functional Connectivity Between Cortical Sources in Five Meditation Traditions Detected with Lagged Coherence Using EEG Tomography,” *NeuroImage* 60, no. 2 (2012): 1574–86, 1575.

104 Van Dam et al., “Mind the Hype,” 6.

105 Kotherová, “Problematika experimentálního výzkumu,” 77.

106 Van Dam et al., “Mind the Hype,” 3.



ature”¹⁰⁷ even though these studies may involve entirely different meditation practices, each with varying effects.¹⁰⁸

Problems with Participants and Control Groups

A notable shortcoming of research on meditation techniques is the selection of appropriate participants. For instance, there are varying definitions for the categories “novice,” “adept,” and “expert”. In one study, a novice might be defined as someone with minimal experience in meditation,¹⁰⁹ while in another, a novice maybe someone with no experience at all.¹¹⁰ This inconsistency makes comparing such studies quite problematic.

Additionally, examining Buddhist experts¹¹¹ in research presents its own set of challenges. Since this group is so narrowly defined, it cannot be considered a representative sample of the general population. A notable example of research in this field is the recent longitudinal study conducted by Nagesh Adluru and colleagues,¹¹² which focused on brain ageing in YouTuber Yongey Mingyur Rinpoche, a Tibetan monk and experienced meditator. This study gained attention as it supports the idea that meditation practice (regardless of the type) can slow

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- 107 E.g. Jonathan R. Krygier et al., “Mindfulness Meditation, Well-Being, and Heart Rate Variability: A Preliminary Investigation into the Impact of Intensive Vipassana Meditation,” *International Journal of Psychophysiology* 89, no. 3 (2013): 305–13; Stephen Olex et al., “Meditation: Should a Cardiologist Care?” *International Journal of Cardiology* 168, no. 3 (2013): 1805–10; Elissa S. Epel et al., “Meditation and Vacation Effects Have an Impact on Disease-Associated Molecular Phenotypes,” *Translational Psychiatry* 6, no. 8 (2016): e880; Yuichi Kasai et al., “Psychological Effects of Meditation at a Buddhist Monastery in Myanmar,” *Journal of Mental Health* 26, no. 1 (2017): 4–7.
- 108 Matko and Sedlmeier identified 309 meditation techniques and classified them by body activity. They concluded that “meditation” encompasses various techniques with different effects. In Karin Matko and Peter Sedlmeier, “What is Meditation? Proposing an Empirically Derived Classification System,” *Frontiers in Psychology* 10 (2019): 2276.
- 109 Elisa H. Kozasa et al., “Meditation Training Increases Brain Efficiency in an Attention Task,” *NeuroImage* 59, no. 1 (2012): 745–49.
- 110 Judson A. Brewer et al., “Meditation Experience Is Associated with Differences in Default Mode Network Activity and Connectivity,” *Proceedings of the National Academy of Sciences* 108, no. 50 (2011): 20254–59.
- 111 Gisela E. Full et al., “Meditation-Induced Changes in Perception: An Interview Study with Expert Meditators (Sotapannas) in Burma,” *Mindfulness* 4, no. 1 (2013): 55–63; Kasai et al. “Psychological Effects of Meditation...,” 4; Brewer et al., “Meditation Experience,” 20258; Marta Alda et al., “Zen Meditation, Length of Telomeres, and the Role of Experiential Avoidance and Compassion,” *Mindfulness* 7, no. 3 (2016): 651–59.
- 112 Nagesh Adluru et al., “BrainAGE and Regional Volumetric Analysis of a Buddhist Monk: A Longitudinal MRI Case Study,” *Neurocase* 26, no. 2 (2020): 79–90.

down the ageing process.¹¹³ Even though the researchers acknowledge some limitations of their study, they do not adequately consider that an expert meditator like Rinpoche may have a personal inclination towards meditation and possess characteristics that set him apart from the general population even before the study began. Moreover, there is insufficient consideration of individual factors, such as the meditator's hereditary genetic background. Additionally, the research does not account for the possibility that their participant could be an outlier, representing a deviation from the general population.

One issue associated with study participants is the proper setup of control groups. When research includes a control group, we can find research where it is common for control participants to simply “do nothing”¹¹⁴ and “continue with their lives as usual”.¹¹⁵ When we compare these control participants—who are not actively engaged with any treatment—to an exercise group that is participating in some form of exercise, we are likely to observe significant differences in outcomes. Moreover, it will not be clear whether meditation really caused the resulting effect or resulted from social interactions with other participants during regular meditation sessions. Janice Kiecolt-Glaser et al. found that geriatric participants who practised relaxation exercises showed significant improvements in their immunity against tumors and viruses. However, this immune system improvement was also noted in retirees who simply increased their social contact.¹¹⁶

Another important consideration, in addition to the correct setting of the control condition, is the proper recruitment of the control population. Unfortunately, we can observe in some meditation research that the control group differs in ethnicity, nationality or both¹¹⁷ from the experimental group. Even more fundamental methodological error occurs when, for example, an individual (often a religious expert) is compared to the entire control group.¹¹⁸

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- 113 In mindfulness meditation eg. Nirodhi Namika Dasanayaka et al., “Impact of Meditation-Based Lifestyle Practices on Mindfulness, Wellbeing, and Plasma Telomerase Levels: A Case-Control Study,” *Frontiers in Psychology* 13 (2022). In loving-kindness meditation eg. Elizabeth A. Hoge et al. “Loving-Kindness Meditation Practice Associated with Longer Telomeres in Women,” *Brain, Behavior, and Immunity* 32 (2013): 159–63. In zen meditation eg. Alda et al., “Zen Meditation, Length of Telomeres.”
- 114 See eg. Ratee Sudsuang et al., “Effect of Buddhist Meditation on Serum Cortisol and Total Protein Levels, Blood Pressure, Pulse Rate, Lung Volume and Reaction Time,” *Physiology & Behavior* 50, no. 3 (1991): 543–48.
- 115 See eg. Caroline J. Hoffman et al., “Effectiveness of Mindfulness-Based Stress Reduction in Mood, Breast- and Endocrine-Related Quality of Life, and Well-Being in Stage 0 to III Breast Cancer: A Randomized, Controlled Trial,” *Journal of Clinical Oncology* 30, no. 12 (2012): 1335–42.
- 116 Janice Kiecolt-Glaser et al., “Psychosocial Enhancement of Immunocompetence in a Geriatric Population,” *Health Psychology* 4, no. 1 (1985): 25–41.
- 117 Adluru et al., “BrainAGE,” 79–90.
- 118 Adluru et al., “BrainAGE.”



Self-Reporting

A substantial portion of the research on Buddhist meditations is based on self-reporting by participants, whether in the form of questionnaire batteries or interview studies. Recent studies emphasize the limitations of using self-reporting as the sole measurement method.¹¹⁹ One major concern is *confirmation bias*, which refers to the tendency of participants to distort their responses on the basis of their pre-existing opinions and beliefs.¹²⁰ This bias is particularly pronounced in situations where participants are prompted to think deeply or deliberate extensively about their experiences.¹²¹ If research is conducted on practising Buddhists, the chances of receiving positive reports on the effects of meditation will be high. Moreover, more religious people tend to make more “positive self-judgments” than less religious people.¹²²

Research on practising Buddhists may thus be influenced by the general tendency of religious individuals to present themselves in a more favourable light compared to a control group. This phenomenon was confirmed by research conducted by Gebauer et al., which found that those who practised loving-kindness meditation exhibited an even greater “self-enhancement bias” than the control participants.¹²³ This can further skew the results of this type of research. Another type of bias associated with self-reporting research is “social desirability bias,” which refers to the tendency of survey respondents to answer questions in

119 David A. Northrup, *The Problem of the Self-Report in Survey Research*, working paper (Institute for Social Research, 1997).

120 This may be a consequence of an attempt to reduce cognitive dissonance that can result from exposure to information that is inconsistent with one’s beliefs. More in Jeremy A. Frimer et al., “Liberals and Conservatives Are Similarly Motivated to Avoid Exposure to One Another’s Opinions,” *Journal of Experimental Social Psychology* 72 (2017): 1–12. C. J. Charpentier et al. have shown another possible explanation for this bias: mesolimbic reward circuitry selectively treats the opportunity to gain knowledge about favourable, but not unfavourable, outcomes as a reward to be approached. Participants thus have the tendency to choose knowledge about future desirable outcomes more than about undesirable ones. In Caroline J. Charpentier et al., “Valuation of Knowledge and Ignorance in Mesolimbic Reward Circuitry,” *Proceedings of the National Academy of Sciences* 115, no. 31 (2018).

121 David L. Dickinson, “Deliberation Enhances the Confirmation Bias: An Examination of Politics and Religion,” working paper, *IZA Discussion Papers* (2020).

122 Kimmo Eriksson and Alexander Funcke, “Humble Self-Enhancement: Religiosity and the Better-Than-Average Effect,” *Social Psychological and Personality Science* 5, no. 1 (2014): 76–83.

123 Jochen E. Gebauer et al., “Mind-Body Practices and the Self: Yoga and Meditation Do Not Quiet the Ego but Instead Boost Self-Enhancement,” *Psychological Science* 29, no. 8 (August 2018): 1299–1308.

a way that others will view positively.¹²⁴ If a participant knows that meditation should positively affect them, there is a high probability that they will report this effect.¹²⁵ This bias can be influenced by the experimenters,¹²⁶ who often express their expectations that participants will improve their abilities in various mental skills, such as attention and equanimity.¹²⁷ The questionnaires themselves can also play an important role in distorting the results. For example, if we give a questionnaire to a practising meditator about his meditation experiences, he will undoubtedly understand and value items differently than someone who has not practised meditation. Moreover, it turns out that the questionnaires themselves often do not always correlate with meditation practice.¹²⁸

Contemplative Neuroscience and Measuring Instruments' Limitations

Many studies have examined the effects of meditation, utilizing not only questionnaires and self-reports but also devices that provide researchers with more objective data. A prevalent type of meditation research uses Electroencephalography (EEG) as a method used to record the electrical activity of the brain, or Functional Magnetic Resonance Imaging (fMRI) as a method used for functional brain imaging or mapping the brain's response to various external or internal stimuli. This area of meditation research is often associated with a group of scientists known for their work in "contemplative science"¹²⁹ or, more specifically, "contemplative neuroscience".¹³⁰ These neuroscientists are representatives of the previously mentioned "gantha-dhura academics", who would likely struggle to convince us about their impartiality in research. Jenny Eklöf has even pointed out the interconnectedness and alliance between contemplative neuroscience and mindfulness, each supporting and reinforcing the other.¹³¹ Scientists are not shy about affirming themselves with claims such as that their field is making "cutting-edge discoveries" or that they are on the verge of a revolution in science that

124 Ivar Krumpal, "Determinants of Social Desirability Bias in Sensitive Surveys: A Literature Review," *Quality & Quantity* 47, no. 4 (1. June 2013): 2025–47.

125 Eg. Fredrickson et al., "Open Hearts Build Lives," 1051.

126 Eg. Christian Gaden Jensen et al., "Mindfulness Training Affects Attention—Or is it Attentional Effort?," *Journal of Experimental Psychology General* 141, no. 1 (2011): 106–23.

127 Van Dam et al., "Mind the Hype," 9.

128 Van Dam et al., "Mind the Hype," 8.

129 Alan B. Wallace, *Contemplative Science: Where Buddhism and Neuroscience Converge* (Columbia University Press, 2007).

130 Evan Thompson, "Contemplative Neuroscience as an Approach to Volitional Consciousness," in *Downward Causation and the Neurobiology of Free Will*, ed. Neil Murphy, George F. R. Ellis, and Timothy O'Connor (Springer, 2009), 187–97.

131 Eklöf, "Saving the World."



could save our culture.¹³² The statements of some contemplative neuroscientists, such as Richard Davidson, are almost religiously engaged:

If we are really going to change the culture... we need the aspiration to have effects as wide and deep as possible... We have to influence the most important and powerful and prestigious institutions. The only way to do this is by playing the game as well or as better as they do... this will require a lot of time, money and hard work... It's going to have to happen on a level we have never seen before on the planet.¹³³

Unfortunately, this alliance is again associated with problematic research on Buddhist meditations. The very process of obtaining results from measurements, e.g. from fMRI, involves a complex and difficult process of following biological and computational steps that lead to conclusions about changes in brain structure and function. However, these individual steps are often not detailed in research publications. Instead, authors tend to use simplified color images of brain scans, which are sometimes created by averaging results across a group of participants. This can lead to oversimplified interpretations of the subtle nuances of neurocognitive and affective manifestations.¹³⁴ For instance, some research indicates that areas of the brain involved in attention regulation are activated after mindfulness meditation.¹³⁵ However, whether these changes are directly linked to better attentional performance remains unclear.¹³⁶

Another issue arises from the efforts of academics to create an image of the “uniqueness of Buddhist meditations.” This is often accompanied by the tendency to present research outcomes as being solely linked to meditation practices. However, it is important to note that similar results can also be found with other relaxation exercises or even through playing musical instruments.¹³⁷

Researchers also do not report the problematic sensitivity of measuring instruments. In techniques such as fMRI, a simple movement of the head or different

132 Eklöf, “Saving the World,” 328.

133 John Tresch, “Experimental Ethics and the Science of the Meditating Brain,” in *Neurocultures: Glimpses into an Expanding Universe*, ed. Fernando Ortega and Francisco Vidal (Peter Lang, 2011), 49–68, 55.

134 Van Dam et al., “Mind the Hype,” 15.

135 Jill A. Brefczynski-Lewis et al., “Neural Correlates of Attentional Expertise in Long-Term Meditation Practitioners,” *Proceedings of the National Academy of Sciences* 104, no. 27 (2007): 11483–88; Micah Allen et al., “Cognitive-Affective Neural Plasticity Following Active-Controlled Mindfulness Intervention,” *The Journal of Neuroscience* 32, no. 44 (2012): 15601–10.

136 Yi-Yuan Tang et al., “The Neuroscience of Mindfulness Meditation,” *Nature Reviews Neuroscience* 16, no. 4 (2015): 213–25, 217.

137 Van Dam et al., “Mind the Hype,” 16.

breathing patterns are enough to influence the results.¹³⁸ If we have non-meditators as a control group in the research, they will likely be more restless or breathe faster than the experienced meditators with whom they will be compared. This discrepancy can lead to false group differences.¹³⁹ The research by Travis et al. even suggests that the fMRI procedure itself (high dB noise; lying down) strongly influences subjective and neurophysiological responses during meditation practice and can, therefore, confound the interpretation of results from fMRI studies.¹⁴⁰ Deep concerns about the rigour of neurological research on meditation are also expressed by Kieran C. R. Fox's team, who reviewed and meta-analyzed 123 brain morphology differences from 21 neuroimaging studies examining ~300 meditation practitioners.¹⁴¹

Key issues associated with contemplative science are as follows: Researchers studying Buddhist meditation using imaging techniques tend to report primarily on the potential benefits of these practices for mental health and brain function. However, they seldom discuss the limitations of neuroimaging methods or the data gathered from them.¹⁴² As a result, these studies are presented to other scientists, journalists, and the public in a way that not only reinforces the effectiveness of meditation but also supports the researchers' own advocacy for Buddhism, thus enhancing its authority in the Western world. Ron Purser elaborates on this: "It does all this with the apparent authority not only of science but of the most archetypal of the "hard" sciences, thanks to its use of "magnetic resonance," "electro-encephalography," and other such technology."¹⁴³

Conclusion

Even though current research on Buddhist meditation indicates numerous benefits,¹⁴⁴ this article highlights the necessity for such studies to remain devoid of controversial influences that pose critical questions. A significant concern in-

138 Laurent Petit and Michael S. Beauchamp, "Neural Basis of Visually Guided Head Movements Studied With fMRI," *Journal of Neurophysiology* 89, no. 5 (2003): 2516–27.

139 Van Dam et al., "Mind the Hype," 15.

140 Frederick Travis et al., "Does the MRI/fMRI Procedure Itself Confound the Results of Meditation Research? An Evaluation of Subjective and Neurophysiological Measures of TM Practitioners in a Simulated MRI Environment," *Frontiers in Psychology* 11 (2020): 728.

141 Kieran C. R. Fox et al., "Is Meditation Associated with Altered Brain Structure? A Systematic Review and Meta-Analysis of Morphometric Neuroimaging in Meditation Practitioners," *Neuroscience & Biobehavioral Reviews* 43 (July 2014): 48–73.

142 Van Dam et al., "Mind the Hype," 16.

143 Ronald E. Purser and David J. Lewis, "Neuroscience and Meditation: Help or Hindrance?," in *The Oxford Handbook of Meditation*, ed. Miguel Farias, David Brazier and Mansur Lalljee (Oxford University Press, 2021), 937.

144 Aneeqe Jamil et al., "Meditation and Its Mental and Physical Health Benefits in 2023," *Cureus* 15, no. 6 (June 19, 2023): e40650.

volves the potential influence of various religious groups,¹⁴⁵ which may utilize scientific findings to sway their followers. This situation prompts an important inquiry into how the scientific community can protect itself from these influences, given that they may ultimately undermine its credibility. Therefore, future clinical applications involving meditation must strive for greater consistency and better control. As the replication crisis illustrates, one viable solution is replicating research studies and publishing in open science¹⁴⁶ to mitigate these problems.

Several issues discussed herein arise from researchers' inadequate understanding of the historical context of the phenomenon they are studying. This lack of awareness often leads to the oversimplification and homogenization of meditation practices, neglecting their diversity¹⁴⁷ and critical information regarding their application. For example, certain Buddhist traditions indicate that specific forms of meditation may not be suitable for all personality types¹⁴⁸ (which may be vital for tracking potential adverse effects), but this information has not yet been revealed in psychological research. Therefore, a comprehensive understanding of meditation practices' historical and anthropological background is also necessary. Conducting field research in natural environments can thus provide valuable insights, thereby deepening the overall understanding of this complex phenomenon.

A significant controversy associated with meditation research is the tendency to portray it solely in a positive light, even though contemporary research has begun to point out that meditation practices can be burdened with many types of adverse effects.¹⁴⁹ Not only does publication bias play a large role in this, but many scientists also adapt their research to popular trends. Additionally, the new influence of academics on social networks has become a certain accelerator for the over-positive presentation of their research.¹⁵⁰ This article advocates for ethical responsibility among researchers to prevent harm and encourages active monitoring for adverse effects of meditation. Given the widespread adoption of meditation practices, prioritizing further research in this area is essential.

This article also elucidates that research on meditation exists within a broader framework concerning the adaptation of Buddhism in Western contexts, particularly through the lens of scientific inquiry. The scientific approach has provided Buddhism with a robust mechanism for adaptation, thereby facilitating its successful integration into Western culture.

145 See above.

146 Hoogeveen and van Elk, "Advancing the Cognitive Science."

147 Van Dam et al., "Mind the Hype," 3; Matko and Sedlmeier, "What is meditation?"

148 E.g. Sarvāstivāda.

149 Lambert et al., "Adverse Effects of Meditation"; Greenberry B. Taylor et al., "The Adverse Effects of Meditation-Interventions and Mind-Body Practices: A Systematic Review," *Mindfulness* 13 (2022): 1839–56.

150 Lutkajtis, "'The Answer to All Your Problems?'"