

Impact case study (REF3)

Institution: Liverpool John Moores University (LJMU)		
Unit of Assessment: UOA4		
Title of case study: Making meditation accessible: Cognitive processes of mindfulness meditation		
Period when the underpinning research was undertaken: 2008 – 2019		
Details of staff conducting the underpinning research from the submitting unit:		
Name(s): Dr Peter Malinowski	Role(s) (e.g. job title): Reader in Cognitive Neuroscience	Period(s) employed by submitting HEI: from 02/2003
Period when the claimed impact occurred: from 2013 onward		
Is this case study continued from a case study submitted in 2014? N		
<p>1. Summary of the impact</p> <p>In several neuroscientific studies we demonstrated that people who meditate for 10 minutes a day for just a few weeks become more aware of their mental processes and respond less impulsively. We summarised these insights in a neurocognitive model that is used worldwide to introduce secular meditation in non-therapeutic contexts: (1) Through various communication channels the member of the public as well as employees learn to integrate meditation into their life. (2) A German company offers a meditation trainer pathway and employee training programmes to promote meditation in occupational settings and workplaces. (3) A Spanish company trains teachers and parents in Spain and Latin America in supporting the neurocognitive development of children.</p>		
<p>2. Underpinning research</p> <p>This case study reflects the research of Peter Malinowski, Reader in Cognitive Neuroscience, Co-Director of the <i>Research Centre for Brain and Behaviour</i> and Director of the <i>Meditation Research Lab</i> at LJMU. Aided by PhD students, research officers and international collaborations, his work significantly contributes to understanding the cognitive mechanisms involved in meditation practice and explains how cognitive functions and underlying brain networks improve when people meditate regularly.</p> <p>His line of research diverts from the majority of meditation and mindfulness research, which is concerned with the therapeutic effectiveness of mindfulness programmes such as mindfulness-based stress reduction or mindfulness-based cognitive therapy. Malinowski's work addresses two other important questions: (1) whether meditation is the main active ingredient in these therapeutic programmes and (2) what the specific neurocognitive mechanisms of meditation are. Toward this end, his research programme isolates one specific meditation practice: mindful breath awareness training (M-BAT). M-BAT is a meaningful research target because it is widely practiced within therapeutic mindfulness-based programmes and within many meditation traditions. Also, it is generally accepted that it involves the same cognitive mechanisms as other meditation exercises. Revealing these mechanisms allows to explain meditation in a scientific way and underpins the fine-tuning of meditation programmes for different purposes or populations.</p> <p>Malinowski's research programme into the neurocognitive effects of meditation started with a 2009 landmark paper [R1], one of the first studies to convincingly demonstrate superior meta-cognitive abilities of mindfulness meditators over non-meditators. It was followed by a series of randomised controlled studies [e.g. R2, R4, R5, R6] confirming the causal role of M-BAT in enhancing cognitive functions. All these studies demonstrated that 10 minutes of M-BAT per day improves cognitive functions: R4 was the first randomised active controlled study to demonstrate improved cognitive functions in older adults as a result of meditation, while R6 showed that three weeks of M-BAT reduces impulsive responding, a behavioural trait that contributes to psychological dysregulation and addictive behaviours.</p>		

In 2013, Malinowski published a model that describes the neurocognitive processes involved in M-BAT and similar meditation practices [**R3**]. This model became an influential and widely used resource for explaining meditation, the involved cognitive functions and the brain networks that are trained when meditating. Its intuitively understandable visual representation (see Figure 1 in Section 4) contributes to its wide adaptation.

Malinowski's research programme led to the following important insights:

1. M-BAT **improves meta-cognitive control functions** including:
 - a. the ability to exert control over automatic response tendencies, either changing or aborting them [**R2**, **R4**, **R6**]
 - b. the ability to monitor goal directed behaviour [**R4**, **R6**]
2. M-BAT **improves working memory functions** and the ability to **sustain highly focused attention over longer time periods** [**R5**].
3. Short M-BAT exercises of **only 10 minutes per day** are sufficient to enhance cognitive functions when carried out regularly for **a minimum of three weeks** [**R6**].

These changes have been demonstrated as improved behavioural performance and as more efficient, less resource-intensive brain activity assessed with electrophysiological measures.

3. References to the research

- R1** Moore, A. & **Malinowski, P.** (2009). Meditation, mindfulness and cognitive flexibility. *Consciousness & Cognition*, 18(1), 176-186. [doi:10.1016/j.concog.2008.12.008](https://doi.org/10.1016/j.concog.2008.12.008)
- R2** Moore, A.W., Gruber T., Deroose, J., & **Malinowski, P.** (2012). Regular, brief mindfulness meditation practice improves electrophysiological markers of attentional control. *Frontiers in Human Neuroscience*, 6, 18. [doi: 10.3389/fnhum.2012.00018](https://doi.org/10.3389/fnhum.2012.00018)
- R3** **Malinowski, P.** (2013). Neural mechanisms of attentional control in mindfulness meditation. *Frontiers in Neuroscience*, 7, 8. [doi: 10.3389/fnins.2013.00008](https://doi.org/10.3389/fnins.2013.00008)
- R4** **Malinowski, P.**, Moore, A. W., Mead, B. R. & Gruber, T. (2017). Mindful Aging: The effects of regular brief mindfulness practice on electrophysiological markers of cognitive and affective processing in older adults. *Mindfulness*, 8(1), 78-94. [doi: 10.1007/s12671-015-0482-8](https://doi.org/10.1007/s12671-015-0482-8)
- R5** Schöne, B., Gruber, T., Graetz, S., Bernhof, M., & **Malinowski, P.** (2018). Mindful breath awareness meditation facilitates efficiency gains in brain networks: A steady-state visually evoked potentials study. *Scientific Reports*, 8(1), 13687. [doi: 10.1038/s41598-018-32046-5](https://doi.org/10.1038/s41598-018-32046-5)
- R6** Pozuelos, J. P., Mead, B. R., Rueda, M. R. & **Malinowski, P.** (2019). Short-term mindful breath awareness training improves inhibitory control and response monitoring. *Progress in Brain Research*, 244, 137-163. [doi: 10.1016/bs.pbr.2018.10.019](https://doi.org/10.1016/bs.pbr.2018.10.019)
- All research articles are published in high-quality, international peer reviewed journals.
 - The research was funded by two grants (2009/10 and 2011/12) from the BIAL-Foundation, Portugal, totalling approx. £ 84,000.
 - **R6** was supported by a grant to J. P. Pozuleos by the Spanish Ministry of Education

4. Details of the impact

The impact builds on the detailed understanding of neurocognitive processes of meditation and on the insight that positive effects of meditation can be achieved in a flexible way, with a low-dose meditation regime that is easily integrated into daily routines.

The widely held view that meditation is a religious or esoteric practice with little relevance to the mainstream has – over the last 20 years – been complemented by a more appropriate but still limited view, which portrays mindfulness meditation only as therapeutic tool to counteract stress, depression, anxiety, and other mental health conditions. The work of Malinowski, however, overcomes both stereotypes. His scientific work and public engagement contribute to moving meditation out of the religious/esoteric corner and likewise shows that meditation is much more than a remedial treatment for problems or dysfunctions. He positions meditation as preventative tool, somewhat similar to physical exercise regimes, highlighting improved cognitive functions, brain processes and associated behaviours when meditating for 10 minutes per day for just a few weeks. Most impact thus manifests outside of therapeutic or clinical settings, for instance in educational and occupational contexts and within the general population where meditation is promoted through public engagement activities.

10 minutes a day: meditation as lifestyle approach

Malinowski regularly engages with mass media, as most effective way of making the benefits of meditation known and encouraging the general public to take up meditation.

His research was presented on three BBC TV programmes (with a total of 3.5 million viewers [IS1]), including the popular health programmes “*Trust me I’m a Doctor*” (22 Sep 2016) and “*Health: Truth or Scare*” (17 Apr 2018). While difficult to gauge the uptake of meditation by the public, Malinowski’s involvement in the BBC One Wales live programme “*Make Wales Happy*” (23 Jan 2018) provides some indication. It recounted how a group of rugby players, taught by Malinowski, benefitted from M-BAT. When Malinowski commented live on the brain changes of these rugby players, in a concurrent Twitter poll 40% of respondents said that because of viewing this they may try out meditation [IS1]. Interest in this information is reflected in further viewing figures. With over three million viewers, the “*Trust me I’m a Doctor*” episode was particularly popular (25% more viewers than other episodes), and viewers rated the mindfulness piece twice as highly as the equivalent pieces in the other two episodes of that series [IS1]. Further broadcasts include interviews on international radio stations, in Canada (CJAD 800 - “*Leslie Roberts Show*”, 21 Sep 2018) and Australia (ABC RN: Soul Search; 17 Feb 2019: [The Science of Mindfulness](#)). The research was covered by national and international print and online outlets, including the [BBC website](#), and the media outlet “The Conversation”, where [an article appeared](#) in English, French and Indonesian and was read around 120 thousand times, similarly in the New York Times, the magazine of the insurance company AVIVA, and the German magazines “Der Spiegel” and “Psychologie Heute”.

Malinowski also maintains a website and blog (<https://meditation-research.org.uk>) with 2000+ readers and increasing web traffic, where he provides accessible explanations and comments on current meditation research and engages with his audience in discussions about this research and the benefits of meditation practice [IS2].

Meditation in workplace and education

Working with various stakeholders interested in integrating meditation practice into their professional work in a flexible fashion (business coaches, counsellors, teachers, medical doctors, physiotherapists, etc.), Malinowski became the driving force (and one of four founding directors) for setting up the company “Timeless Impact Academy” in Munich in 2016. Operating internationally, the company (TIA) specialises in bringing meditation practices into the workplace through bespoke training programmes, and primarily through its teacher training pathway that leads to the TIA Meditation Trainer Certification. As co-director K.B. Schneider summarises: “*more than 600 people have taken part in training events offered by TIA. 32 people from eight countries (Denmark, Germany, Greece, Ukraine, United Kingdom, USA, Serbia, and Switzerland) qualified*

as TIA meditation trainers and are now using meditation in their own work as business coaches, management and leadership trainers, counsellors, and therapists” [IS3].

The impact of Malinowski's research expertise ranges from the local level to large scale international corporations. For example, building on his research he developed a bespoke mindfulness at work staff development programme that has been attended by more than 250 LJMU staff, many still using the learned tools. During the pandemic, he developed online videos for the LJMU student and staff community. He was involved in implementing and evaluating a mindfulness meditation programme in a creative SME in London, leading to regular meditation offers within that company. This work is included as case study in the report by the [Mindfulness All Party Parliamentary Group](#) in Westminster, to support making a business case for meditation in the workplace [IS4].

In June 2015, Malinowski trained a group of 15 medical staff (from neurosurgeons to nurses) at the *Hospital Bité Médica* in Mexico City in evidence-based mindfulness meditation. In 2017, Malinowski advised the Mindfulness Employee Resource Group of Novartis in Basel on how to implement and develop science-led and evidence-based mindfulness offers throughout the international pharmacological corporation. As Novartis' Global Mindfulness Lead explains: This group has become a very active employee resource group that *“currently reaches annually about 15,000 associates with (...) more than 250 mindfulness practice sessions,”*. Its *“uptake and regular practice by many associates and leaders is supporting culture change [at Novartis] towards a curious, inspired, unbossed organization underpinned by integrity”* [IS5]. In July 2018, Malinowski gave presentations about the benefits of meditation at the European Parliament in Brussels, to about 80 MEPS and their staff. Encouraged by this, a staff group met weekly for meditation within parliament, until suspended due to the pandemic [IS6].

Since 2019, Dr Malinowski provides scientific advice to a Spanish company: Mindset-Neuroeducation. This University of Granada spin-off was founded by Dr Pozuelos, a former visiting researcher in Malinowski's lab [R6]. The company is specialised in enhancing the neurocognitive development of children through direct online training programmes as well as training for teachers, parents, and carers. The CEO explains: *“Dr Malinowski's neuro-cognitive model of meditation constitutes a central component of our teacher training program, our attention and executive function training for school children, the associated training and advice for parents and our educational offers for the general public.”* 15 teachers from 6 [catholic schools across Spain](#) have now been trained to deliver the programme. Based on a €40K contract with two Chilean foundations, 60 teachers in two schools for disadvantaged, high-risk children in Santiago de Chile have been trained and will now deliver the program [IS7].

The description and visual representation (Fig. 1) of neurocognitive mechanisms of meditation [Fig.2 in R3] has been taken up internationally to explain meditation: it has been integrated into educational materials for mindfulness and meditation trainers, represented in books and other expositions of meditation, with known translations of the diagram into Bulgarian, German, Italian, Spanish, Swedish and Russian, including a beautiful adaptation by the Singapore Art Museum [IS8].

Based on his scientific work, Malinowski produced educational material [IS9] and made it available for free download. In the second half of 2020 alone, the material was downloaded by 132 individuals and reached 35 different countries, across five continents. The majority (64%) downloaded the material for professional use, as psychotherapists, counsellors, coaches, business consultants, mindfulness trainers, academics, teachers, health professionals, and others. It is estimated that during the second half of 2020 around 6,385 people worldwide were reached by this educational material [IS10].

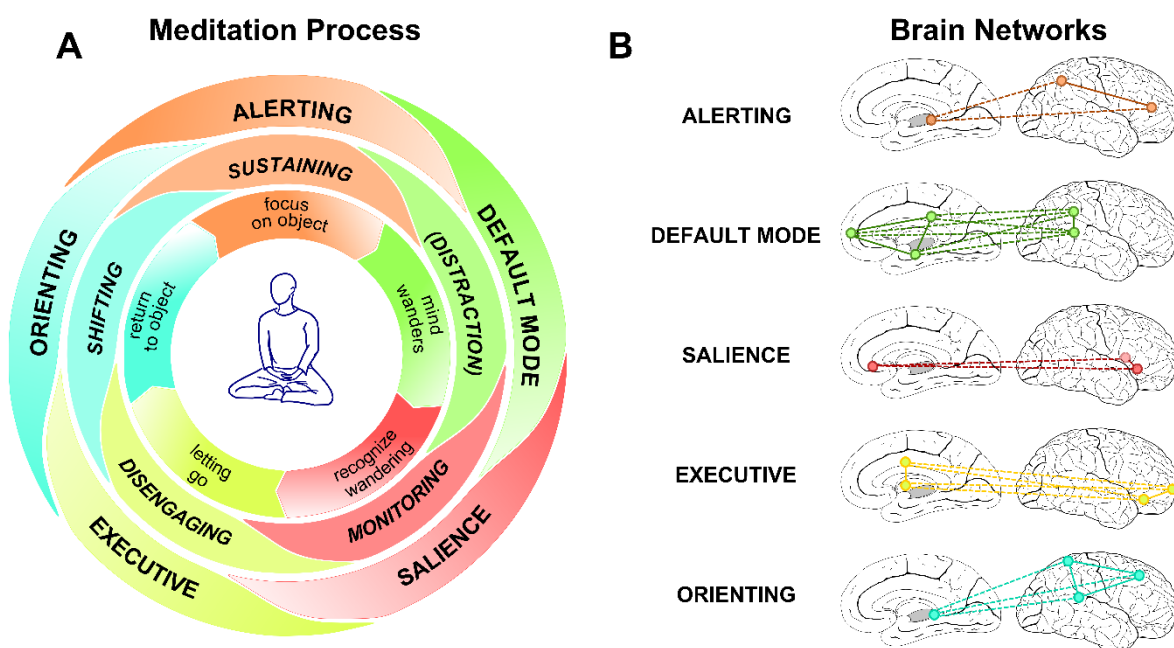


Fig.1: The widely used, reproduced, and translated neurocognitive model from R3, depicting the experience associated with meditation (inner circle), the involved cognitive processes (middle circle) and supporting brain networks (outer circle)

5. Sources to corroborate the impact

- IS1** BBC viewing figures and Twitter poll results, BBC One Wales live show “Making Wales Happy” (23/01/2018)
- IS2** <https://meditation-research.org.uk> website statistics
- IS3** Testimonial letter from co-director of Timeless Impact Academy GbR.
- IS4** Case study in Mindfulness All Party Parliamentary Group report mindfulness in the workplace.
- IS5** Testimonial from Be Mindful Employee Resource Group at *Novartis*
- IS6** Testimonial of Malinowski’s engagement in the European Parliament
- IS7** Testimonial letter from the CEO Mindset Neuroeducation, summarising Malinowski’s influence as scientific advisor for the company
- IS8** Examples of the international adaptations of the neurocognitive meditation model published in Malinowski (2003) – R3
- IS9** Educational material in English, German, and Spanish, based on Malinowski (2003) – R3
- IS10** Detailed download and usage data for the educational material (IS9)