

**MINDFULNESS THERAPIES & RECENT BIOLOGICAL SCIENCE:
WHAT MATTERS AMIDST THE HYPE, FOR INEFFABLE ME, IRREDUCIBLE YOU?**

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Table of Contents

Acknowledgements	3
Abstract	4
Introduction	5
CHAPTER 1: MINDFULNESS THERAPIES & ITS ACHIEVEMENTS	7
The First Modern Mindfulness Psychotherapy (MBSR)	7
What Neuroscience Is Contributing	9
CHAPTER 2: MINDFULNESS RESEARCH & CROSS-DISCIPLINARY RESEARCH	11
Sub-components of Mindfulness Therapy	11
Mindfulness in the Scanner	12
Bea's Case	14
Developmental Neuroscience of Personality	14
Compassion Therapy & Heart Rate Variability	14
Varieties of Contemplative Experience	16
CHAPTER 3: SOME CRITIQUES & CONSTRAINTS	18
Objections from Philosophy & Social Science	18
Revisiting Freud & Psychoanalysis with Neuroscience	19
Mind the Hype	20
CHAPTER 4: DISCUSSION	22
Masters of their Domain	22
Integration versus Relativism	22
Negative Capability	23
CONCLUSION	24
REFERENCES	25

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Abstract

Mindfulness Therapy has become part of the stable of psychotherapy since the 1980s when Jon Kabat-Zinn established Mindfulness Based Stress Reduction (MBSR) as an effective therapeutic intervention. That programme melded roots from Buddhist Psychology with Western Cognitive Science and Group Therapy. Some terms were deliberately loosely defined at that time, including mindfulness itself. So how is recent research into mindfulness, including cross-disciplinary research with biological neuroscience and other scientific disciplines and the recent cultural popularity of mindfulness, impacting on mindfulness therapy and its clinical delivery? What of recent critiquing of those loose definitions around mindfulness and its research base? This paper explores how mindfulness therapy has been challenged and developed over the last 35 years by biological science and research. This paper discusses cross-disciplinary research involving mindfulness, the inherent difficulties of such cross-disciplinary conversations, how this research is shaping the manner in which therapy that uses aspects of mindfulness is evolving, including highlighting some of the risks and opportunities that may not be widely acknowledged to date.

Introduction

Mindfulness as a modern intervention in western psychotherapy is broadly discussed as beginning in the 1980s with the work of Jon Kabat-Zinn (1990) and his Mindfulness Based Stress Reduction (MBSR) programme. His work brought together understandings from Buddhist psychology, western cognitive therapy and clinical group work, initially in the treatment of chronic pain and stress. Kabat-Zinn later described this work as a 'public health intervention, a vehicle for both individual and societal transformation' (2011, p.282). Some mechanisms and terminology, including the definition of mindfulness itself, were left deliberately broad in this early incarnation.

Since that time, MBSR and other forms of mindfulness therapy as a psychotherapeutic intervention have become well known, and much research into its efficaciousness and mechanisms has developed. The aim of this paper is to explore how biological science has challenged and informed mindfulness therapy in recent years. This paper discusses cross-disciplinary research involving mindfulness, the inherent difficulties of such cross-disciplinary conversations, how this research is shaping the manner in which therapy that uses aspects of mindfulness is evolving, including highlighting some of the risks and opportunities that may be less widely acknowledged to date.

Chapter 1 presents an overview of the origins of mindfulness therapy, as developed by Kabat-Zinn with MBSR. It then introduces neuroscience and recent research aiming to find biological correlates in the brain for some of the traits being explored in mindfulness therapy and some interesting findings around the Default Mode Network of the brain.

Chapter 2 explores some of the cross-disciplinary research, including research aiming to parse mindfulness therapy out into separate traits and mechanisms and how some therapies avail of different aspects of mindfulness.

The ways of knowing something *objectively* and knowing something *experientially* have proved difficult to align. Thus Chapter 3 discusses some of the philosophical caveats around this evolving scientific epistemology and mindfulness therapy, and some of the risks that are perhaps not generally widely acknowledged in mindfulness therapy.

Finally, Chapter 4 collects the themes of discussion from the previous chapters, attempts to integrate these disparate spheres of knowledge as far as is useful and points towards how mindfulness therapy will evolve from its first therapeutic emanations.

CHAPTER 1: MINDFULNESS THERAPIES & ITS ACHIEVEMENTS

The First Modern Mindfulness Psychotherapy (MBSR)

Jon Kabat-Zinn (1990) pioneered bringing the scientific method to the practise of mindfulness and how it could be used to treat some forms of mental illness via Mindfulness Based Stress Reduction therapy (MBSR). In the brief time Since Kabat-Zinn's seminal work, research into mindfulness has exploded in its volume and application. Within the literature review of Lindahl, Fisher, Cooper, Rosen & Britton's (2017) study on the varieties of contemplative experience, they summarise how mindful therapy has been found to be helpful in addressing a variety of pathologies, including anxiety, addiction, chronic pain, depression and stress. In a similar example, Ortiz & Sibinga's (2017) study on the adverse effects of childhood trauma, finds that 'high-quality, structured mindfulness interventions improve mental, behavioural and physical outcomes in youth' (p.13). Their literature review repeats the widely reported findings that MBSR and its derivatives (such as Mindfulness Based Cognitive Therapy, Mindfulness Based Relapse Prevention) have been shown to be effective in treating conditions such as addiction and reducing depression relapses. They also comment on how the type and location of training varies tremendously, even within the childhood population in schools which they studies. This highlights a concern, which we will return to later, over the salient factors of mindfulness training and its reproducibility.

Kabat-Zinn defined mindfulness as 'paying attention in a particular way: on purpose, in the present moment, and nonjudgmentally' (2005, p.4). Kabat-Zinn (2011) has more recently described how his work translated the "inside" experiential perspective of Eastern buddhist practice into terms acceptable to Western medicine, "self-regulation" rather than "meditation" for instance. His work succeeded in bringing across this Eastern "technology" methodologically rather than philosophically. He explains that his approach was conceived as a public health intervention whilst on a Buddhist meditation retreat, and that it was an explicit attempt to marry the epistemologies of science and

spiritual practice. In this 2011 reflection on his work from the 1980s he shares his view on the purposely broad definition and use of the term *mindfulness*:

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, and interested in making such distinctions and resolving important issues that may have been confounded and compounded by the early but intentional ignoring or glossing over of potentially important historical, philosophical, and cultural nuances— issues that may yet be shown to be critical to a deeper understanding of the mind and its relationship to the brain and body (Kabat-Zinn, 2011, p.290).

Hence he used mindfulness as an “umbrella” term linking a number of different practices and aims, without specifying the active ingredient of any particular exercise, with the hope that later research would add more detail and, possibly, evolution to the work. It is interesting to note that his definition of mindfulness does not necessarily include a suggestion of self-compassion. While this may be inherent elsewhere in the MBSR programme content and approach of the instructors, the wide adoption of this broad definition may have inadvertently under-emphasised the role of self-compassion, as recent research (Hildebrandt, McCall, & Singer, 2017; Neff & Germer, 2017) referred to later will discuss.

He also comments that ‘the quality of MBSR as an intervention is only as good as the MBSR instructor and his or her understanding of what is required’ (2011, p.281). This appears to add a significant subjective and possibly unquantifiable factor to the efficacy of the intervention. He cautions instructors about mixing up the map with the territory, that the experience of participants is in some ways incommunicable or ineffable and that the role of the instructor is also in some ways hard to communicate, ‘intuition-based, more embodied’ (2011, p.297) than cognitive. The group environment and dialogue in which participants can share their experience of the work with each other may counter this unquantifiable quality to some degree.

I will revisit how mindful therapy is evolving from these early protocols in chapter 2 on cross-disciplinary mindfulness research.

What Neuroscience Is Contributing

Neuroscience is a branch of biological science that studies the nervous system and the nerve cells or neurons that make up this system. They are electrically excitable and it is this change in voltages which is picked up by functional magnetic resonance imaging (fMRI) machines to plot the topology of the nervous system. In this way, the activity in different areas of the brain and emotions, thoughts and behaviours have successfully been correlated.

Relevant to the application of psychotherapy is research within neuroscience on the Default Mode Network (DMN) of the brain. A number of regions of the brain, particularly the posterior cingulate cortex (PCC), are shown to be activated during mind-wandering states, including depressive states, and calmed down during focused and joyful states. Mohan et al. (2016) recently reviewed research on DMN and their review supports the view that there are correlated biological characteristics of DMN-functioning with neuropsychiatric disorders such as Alzheimer's disease and attention deficit hyperactivity disorder (ADHD). Mood disorders such as depression seem to have DMN "signature" characteristics, with rumination being detectable, possibly as an imbalance of internal and external focus. For psychotherapy this adds weight to the suggestion that some subjective experiences or traits have measurable biological correlates.

Garrison et al. (2013) have used a model of grounded theory in an interesting combination of first-person reports of mindful meditative practice and fMRI monitoring of brain activity to tease out a taxonomy of mindfulness and how it relates to brain activity. For instance, they found that their categorisations of "distracted awareness" or "controlling" in the participant's mental experience correlated with an uptick in activity in the Default Mode Network (DMN) of the brain. This work and discussion could suggest how the self-reporting of meditation experience may provide a feedback

loop pointing to where the exercises or therapy are successful or unsuccessful in reducing rumination, which is a common symptom in some forms of depression and anxiety.

In other cross-disciplinary research, Huang et al. (2014) have used neuroscience (via fMRI machines) and guided imagery therapy. They found physical brain changes from 5 weeks of “top-down regulation” via guided imagery therapy for major depressive disorder patients, aimed at increased self-regulation. This kind of research is useful in giving insight to a “top-down” cognitive therapy and its outcomes, and that this therapy has a particular brain-biology signature which is different from other “bottom-up” experientially-led therapies, for instance.

CHAPTER 2: MINDFULNESS RESEARCH & CROSS-DISCIPLINARY RESEARCH

Sub-components of Mindfulness Therapy

Dr Nicholas Van Dam has performed a number of constructive critiques of mindfulness research. In 2014, Van Dam, Hobkirk, Sheppard, Aviles-Andrews & Earleywine conducted research on participants with peri-clinical (just below, at or above clinical) levels of anxiety, depression and/or stress to identify the active sub-components of the most practiced mindful therapy interventions, Mindfulness Based Stress Reduction and Mindfulness Based Cognitive Therapy. They theorised that there were important subtleties in the application of mindfulness therapy and that the *active ingredients* of this approach were vaguely identified or comprehended. For the purposes of adding granularity to mindfulness, they broke the active ingredients of the therapy into three categories. The categories are (i) mindfulness, (ii) self-compassion and (iii) self-regulation. More significantly, they broke each of these categories down granularly into subcomponents.

The subcomponents of *mindfulness* researched were (i) Observe e.g. “i pay attention to sensations such as the wind in my hair, (ii) Describe e.g. “I have trouble thinking of the right words”, (iii) Act Aware e.g. “ I find myself doing things without paying attention”, (iv) Non-judge e.g. “I think some of my emotions are bad or inappropriate ” and (v) Non-react e.g. “I perceive my feelings without having to react to them”.

The subcomponents of *self-compassion* used were (i) Self-kindness e.g. “I try to be loving to myself when I’m feeling emotional pain”, (ii) Self-judgement e.g. “I’m disapproving of my own flaws”, (iii) Common humanity e.g. “I try to see failings as part of the human condition”, (iv) Isolation e.g. “When I fail at something that’s important to me I tend to feel alone”, (v) Mindfulness e.g. “When something upsets me I try to keep my emotions in balance” and (vi) Over Identification e.g. “When I’m feeling down I tend to obsess and fixate”.

For *emotion regulation* the researchers surveyed for the subcomponents of (i) Non acceptance “when I’m upset I feel guilty for feeling that way”, (ii) Goals “when I’m upset i have difficulty getting work done”, (iii) Impulse “when I’m upset i lose control over my behaviours”, (iv) Awareness “I am attentive to my feelings”, (v) Strategies “when I’m upset it takes me a long time to feel better” and (vi) Clarity “I have no idea how I am feeling”.

The group which followed the mindfulness therapy protocol showed ‘meaningful reductions in anxiety, depression and stress’ (Van Dam et al, 2014, p.8) versus the control group. The only sub-component of the 6 mindfulness components to change significantly was the “Act Aware” sub-scale, while changes in the self-judgement and overidentification sub-scales of self-compassion were most predictive of positive differences for the participants.

This is the type of research that is parsing out the most crucial aspects of mindful therapy, and in this case pointing towards the importance of self-compassion, which as mentioned previously may not be included in some common concepts of mindfulness. Van Dam et al.’s research does however suggest that sub-components of mindfulness are closely tied in development to the subcomponents of self-compassion.

The paper’s literature review also points out the potential effects of group dynamics (which is the context in which mindfulness therapy is often delivered), how different instructors draw on different traditional practices and the effect of pre-existing intention in the minds of the participants. These effects can make the tracking of which processes are effective more difficult.

Mindfulness in the Scanner

Judson Brewer (2017) is a psychiatrist and neuroscience researcher at Yale University and the University of Massachusetts Medical School, and an advocate of mindfulness therapies. Brewer’s research lab has paired up meditators (from beginners to advanced masters) with fMRI scanners that can track activation in different areas of the brain.

In Brewer's book, *The craving mind* (2017), the learnings from mindful therapies are used to address strategies for working with cravings for and addictions to smoking, food and technology. This research is particularly pertinent to the themes of this paper because it adapts and experiments with the protocols of mindfulness therapy to make them more effective. In a brief encapsulation of Brewer's work, Kabat-Zinn, in the foreword to the book, recounts the following:

Jud's real-time neurofeedback studies of activity changes in the PCC during meditation practice, vividly showing what happened in the PCC when his subjects got caught up in trying to bring about an effect, and what happened when they got excited because they did, are dramatic demonstrations of the powerful effects within the brain of non-doing, non-striving, and getting out of your own way in order to be fully present and emotionally equanimous. (Kabat-Zinn, foreword to *The craving mind*, 2018, Kindle ed.)

In some clinical research, Brewer with others (Schuman-Olivier, Hoepfner, Evins & Brewer, 2014) have researched cigarette addiction. They compared an adapted mindful therapy (in which participants mindfully smoked cigarettes) to a cognitive behavioural therapy (CBT) Freedom From Smoking programme control comparison. The outcomes for the treatment groups were similar. However, they observed a higher effect on one sub-group of the mindful approach, suggesting that mindful therapy could potentiate the therapeutic effect of non-judgement behaviour in individuals who had previously rarely judged their inner experience. That is, learning mindfulness skills for some novices improved their outcomes. This is an interesting outcome within this discussion because it suggests that mindfulness training is especially beneficial for some, but not for others, and suggests some of the mechanisms and traits mediated by the therapy.

Brewer and his research lab at University of Massachusetts Medical School have ongoing clinical collaborative research projects on mindfulness and healthy diet in teenagers, smoking cessation, and weight loss maintenance.

Bea's Case

In a case study involving complex developmental trauma, Fischer, Lanius & Frewen (2016) document how psychotherapy, combined with neurofeedback training successfully altered the symptoms and trajectory of a long-term “untreatable” patient with PTSD, depression, dissociation from a young age, who had been responding with only partial success to other approaches including medication and dialectical behaviour therapy. As well as trauma-focused psychotherapy, the client (Bea) played some simple video games which trained her brain to discern and practise different brain rhythms that would calm her neurobiological state. The researchers conclude that a dysregulated nervous system can be put back into balance with this kind of approach. This is an interesting example of a case where neuroscience (in the form of neurofeedback therapy) and talking therapy can collectively offer more than each on their own.

Developmental Neuroscience of Personality

Again embracing cross-disciplinary research on Borderline Personality Disorder, Crowell & Kaufman (2016) review the opportunities in combining the fields of developmental psychopathology, social & affective neuroscience, and personality theory, giving the overlapping area of interest the label of the *developmental neuroscience of personality*. They comment that each of the disciplines involved are complex in their own right, and sometimes operating from incompatible perspectives - locating illness in the individual versus in the systematic environment, for instance. This again is an example of one of the themes in this paper, of apparently competing perspectives struggling to be reconciled. However Crowell & Kaufman note that these combinations of approaches give rise to new creative opportunities, while also commenting on their as yet under-explored synchronicity.

Compassion Therapy & Heart Rate Variability

Compassion therapy has a particular focus on self-judgement and its negative consequences. Two researchers in this field with complementary though different approaches are Kristen Neff

(2017) and Paul Gilbert (2010). Neff describes self-compassion as operationally having 3 components - kindness, common humanity, and mindfulness. Neff developed the Self Compassion Scale (Neff, 2013) which is a widely used self-assessment questionnaire designed to tease out these components. This was the basis of the self-compassion component assess in the researched by Van Dam et al. (2014) mentioned earlier in this paper.

A simple version of the approach to self-compassion offered by Neff follows the following 3 steps. Firstly, to notice a source of suffering (utilising mindfulness, e.g. of feeling a little despondent). Secondly, to affirm that this is something we all experience sometimes (common humanity). Finally, to make a gesture of self-kindness (e.g. a soothing stroke of the arm, or hand to the heart area). In a review on the theory and research into self compassion Neff & Germer (2017) report the finding that 'self-compassion is inversely associated with psychopathology' (p.6) and is particularly valent for depression and anxiety (from a meta-analysis of 20 studies).

They also suggest that more research is needed into how mindfulness and self-compassion differ. More relevant to one of the themes of this paper (risks associated with mindfulness therapy), they suggest that in cases of severe shame or self-criticism it may be necessary to first cultivate self-compassion before mindfulness training in order to have the sense of safety required to open oneself up securely and gainfully.

Gilbert (2010) has developed a programme called Compassion Focused Therapy (CFT) which combines mindfulness training, visualisations and behavioural training. This modality is currently being used to treat eating disorders, anxiety disorders and psychosis amongst other conditions. Research by Matos et al. (2017) suggests that even a short course (2 week) of this type of CFT leads to an improved heart rate variability (HRV) in a non-clinical participant group, HRV being a widely used measure of general health and well-being. In a connected study, Kirby, Doty, Petrocchi & Gilbert (2017) suggest that HRV could in effect be used as a biological proxy for the effectiveness of compassion training of any type. Thus there is the useful prospect of an objectively measurable

feedback loop for therapy, which doesn't suffer from the issues that arise with self-judgement scales. It can be understood too of course that the cost of HRV monitoring is an order of magnitude lower than fMRI or even Electroencephalography (EEG) monitoring options.

Varieties of Contemplative Experience

The Varieties of Contemplative Experience (VCE) project, based out of Brown University and run by clinical psychologist Willoughby Britton Ph.D. and religious studies scholar Jared Lindahl Ph.D. is another example of cross-disciplinary work. Their mixed-method research paper (Lindahl, Fisher, Cooper, Rosen, & Britton, 2017) has produced a taxonomy of experience and categories of influencing experience within US-based (non-clinical) meditation practitioners who reported some adverse side effects during their period of practice. They particularly focused on challenging experiences or periods of functional impairment. In their filtered cohort of 60 participants they found a median period of 1-3 years for such side effects, which is quite significant and something that clinicians should be aware of, where meditation may be separate from a clinical environment. Their literature review also suggests that adverse side effects may be under-reported by a factor of 20, as their research points out that adverse effects to meditation had not been researched to date. In their discussion they suggest that mindful therapy practitioners be familiar with these challenges and know how to manage them.

In European research at the Max Planck Institute in Germany, Hildebrandt, McCall & Singer (2017) have conducted research on meditation training with 3 focuses: presence (e.g. attention meditation such as breath counting), affect (e.g. compassion meditation) and perspective-taking. They found that the 3 modules (done in rotation by 3 subsets of a group) had the effect of thickening cortical tissue in different areas of the brain, and that the affect-compassion module had the effect of reducing the stress hormone cortisol in response to social stress. Thus traits of meta-cognition and theory of mind were trained independently of compassion and altruism. This type of differentiation in outcome is potentially most useful in guiding people to the kind of mindful therapy intervention

that may be appropriate for their circumstance, and pointing out that different types of mindfulness training, all under the mindfulness umbrella, produces different effects.

David Treleaven (2018) favours an approach to mindful therapies which he calls trauma-sensitive mindfulness. While being an advocate for mindfulness, he cautions that mindfulness meditation can exacerbate symptoms of traumatic stress, going as far as retraumatizing an individual if the task is set to maintain focused attention on symptoms connected to the trauma. When trauma is defined as an inability to integrate an experience, it may be that focused attention merely heightens the psychic defence that was necessarily put in place at the time of the trauma in order to cope. Mindfulness can be seen as a cognitive practice, but in trauma there is a pre-existing neurophysiological condition which may mean that relying on a cognitive lead is a flawed model. Treleaven points towards the role of relationships with others in helping build the safety and trust necessary to integrate and move on.

CHAPTER 3: SOME CRITIQUES & CONSTRAINTS

Objections from Philosophy & Social Science

Some objections arise from the advance of the biological sciences into the area of the humanities where philosophy and psychology reside. Some of this conflict comes from what may be seen as an overreach on interpreting the data from neuroscience. For instance, in his manifestly titled books, *The end of faith: Religion, terror, and the future of reason* (2005) and *Waking up: A guide to spirituality without religion* (2015), neuroscientist and commentator Sam Harris suggests that the epistemologies of science and philosophy will coalesce comfortably in the halls of reason. This in itself is a kind of faith-claim, one built precariously on interpreting currently modest scientific understandings. Harris writes, 'There is clearly a sacred dimension to our existence [...] But we will find that it requires no faith in untestable propositions [...] for us to do this' (2005, p. 16). This leans towards a contestable understanding of existence which is reducible to measurable facts. The factual claims of scientific researchers in the papers mentioned herein are more modest in reach.

Raymond Tallis, in a strong polemic against the tide of neuroscience, raises many objections to the discipline in his 2012 book *Aping mankind*. He accuses neuroscience of overreach in a similar but modern vein to Hippocrates when the Greek physician declared 'we are our brains' (p.29). Tallis suggests this science is part of a "BOLD-rush", playing off the awe attributed to brain oxygen-level dependent (BOLD) measures that are revealed with the use of functional MRI machines.

Psychiatrist Philip Thomas, in an online article entitled "Why neuroscience cannot explain madness" (2013) also reproaches neuroscience and claims of complete scientific understanding of experience (referring to proponents, somewhat disparagingly as 'neuromaniacs'). Referring also to the work of Tallis, Thomas outlines significant problems: equating correlation and causation, an

absence of data on a person's intention within the neuroscience model and, again, an absence of the outside world or environment within the neuroscience data or model.

Tallis outlines the type of danger associated with adapting a completely deterministic view of human experience and behaviour. He says 'Neural sociologists are increasingly speaking of delinquent behaviour as being hard-wired by early experience. This is not only pseudoscience, but wrong in another respect, it turns a probability into a certainty' (Tallis, 2012, p.278). These types of concerns arise from attempts to tightly bind interpretations of neuroscience data with human experience, as if a complete picture were contained therein if we only knew how to adequately interpret the data.

Tallis also has harsh words for the areas of the humanities embracing neuroscience, fearing they could be swallowed up by this neuromania when they should traditionally be a bulwark against such scientism (2012, p.277).

As a cultural comment and as a study in biological phenotypes, psychiatrist Ian McGilchrist (2009, 2012) laments the imbalance between right-brain thinking and left-brain thinking in western culture in his books. He suggests culture and scientific mindsets demand a certainty or permanent logic within an idea, while a more flowing interdependent way of knowing (right-brain) which had been culturally stronger before the industrial revolution, may be undergoing a sort of tyranny from this resurgent left-brain logic-bias. This again echoes the theme of a desire to reconcile two ways of knowing that often seem irreconcilable, 'two fundamentally opposed realities' (2009, p.3), similar perhaps to the first-person biological science perspective and third-person subjective humanistic perspective.

Revisiting Freud & Psychoanalysis with Neuroscience

Solms & Panksepp (2012) bring a psychoanalytical perspective to neuroscience. In their paper they reconstitute Freud's model of mental apparatus, whilst showing that neuroscience has in recent

years found neurological correlates to the components of this model which were beyond possibility in the time of Freud. According to their conclusion the id, correlates physically with the lower brain levels, is the seat of affect and of consciousness, which is translated into object “re-representations” by the ego, to which we are then able to give language and imagery. Some evidence for this is provided in referencing case studies of patients who have had brain cortex (higher level brain) injuries yet still clearly have advanced conscious abilities, which suggests that this ability is not seated in the higher level cortex. The paper outlines Endel Tulving’s 3-level model of consciousness (anoetic, noetic, auto-noetic), those being (1) unthinking affective experience, (2) cognitively moderated experience (what we mostly do) and (3) abstracted experience (a reflective mind’s eye or imaginatively created experience). While all three categories confer consciousness (including onto animals and other beings), they particularly discuss the hierarchical and error-prone modes built in to noetic and auto-noetic modes. Indeed, they characterise neurosis as experience that has too quickly moved from noetic to auto-noetic without being properly or accurately modelled in the mind.

Solms & Panksepp’s paper also proposes that the field of cognitive neuroscience is reductionist and neurotic, using a kind of conceptual repression to ignore the information which it already knows. They question the efficacy of reflexive thought if the effect of this ego-driven activity is to dampen core consciousness, the root of affect and life energy. By this interpretation, the free-association of psychoanalysis may have a better chance of connecting to this root issue than to the “downstream” tools of cognitive reflection, including perhaps mindful meditation.

Mind the Hype

Recently, in 2017, Van Dam et al. published an evaluation of mindfulness and meditation called “Mind the hype: A critical evaluation and prescriptive agenda for research on mindfulness and meditation”. They criticise poor methodologies and definitions used within the science to back up the claims of mindfulness and meditation efficaciousness. They suggest that mindfulness and meditation are often confused and that the term mindfulness for research purposes ought itself to

be broken down along at least 11 distinct features, from orientation of attention (external object / internal / focused / diffused), effort made, intention (e.g. loving-kindness, equanimity) and posture. Moreover they point out that despite the volume of research, only a small minority of the research base on mindfulness has passed stage 1 (intervention generation/refinement) onto stage 2 comparisons with active controls and there appears to be a lack of rigour in adding to scientific knowledge in the area. Their literature review quotes a study commissioned by the U.S. Agency for Healthcare Research and Quality suggesting mindfulness therapies have only a moderate effect in reducing symptoms of anxiety, depression and pain (Goyal et al., 2014). In a caution against some reported adverse effects from mindfulness therapy, including the cost of delaying effective treatment, the review quotes Strauss et al. (2014) who suggest caution against offering mindfulness therapies as a first line intervention instead of well-established therapy for people suffering current symptoms.

To some extent this criticism can be seen as a foreseeable but judiciously chosen consequence of early mindfulness protocols, which now needs addressing.

CHAPTER 4: DISCUSSION

Masters of their Domain

Scientists and researchers working in this area are obviously highly proficient in their domains of expertise. There is little doubting the evidence for the collective positive gains in populations engaged in mindful therapies and the added refinement suggested by cross-disciplinary work, for instance by Brewer (2017) and Gilbert (Kirby et al. 2017). Yet it is also clear that the mechanisms by which these changes take place are not as well understood as the mechanisms of some of the physical sciences—the scientific explanation of changing of water into ice is not a good metaphor for the changing of negative affect into positive affect, for instance. When it comes to neuroscience the tools of fMRI have given us some granularity in terms of mapping activation in different parts of the brain. The epistemological difficulty arises when an advocate of one strand of this endeavour attempts to claim that the model within their strand is a comprehensive theory for the mind, perhaps as suggested in the discussion of Sam Harris (2005, 2015).

Integration versus Relativism

Psychotherapy has evolved rapidly, even over its short 100-year history. Since the time of Freud, we have had a “second wave”, integrating behaviourist ideas, and a “third wave”, synonymous with the humanistic integrative approaches of Carl Rogers (2003) and others, which gave back to the client agency and the power for change. With each new wave there is a shift in the level of thinking, of the models of the “mental apparatus”. This is the version of evolution associated with Albert Einstein’s aphorism that ‘no problem can be solved by the same kind of thinking that created it’ (Einstein, A., [wikiquote.org/wiki/Talk:Albert_Einstein](https://www.wikiquote.org/wiki/Talk:Albert_Einstein), n.d.). It can be argued that each of these turnings was perhaps an over-correction on the pendulum-swing of collective wisdom. Skinner’s Behaviourism, whilst contributing much to ideas around learning and conditioning, threw out ideas

of unconsciousness and the drives therein, while Rogers's Person-Centred approach returned the ultimate source of healing and wisdom to each unique individual circumstance rather than a mechanistically predictable model. However, with this has returned what was once a criticism of classical psychoanalysis too: that it is unfalsifiable if based on a premise of subjective supremacy. Thus there is the danger, if not the practice, of validating a subjective incoherent relativism of experience. In practice, many therapists will hold a stance that is not so biddable for interpretation and seek to make some boundaries inviolate with the aim of therapeutically holding the client's experience. The question is, how can we appropriately allow for different perspectives, potentially inconsistent perspectives, within a gestalt that still makes sense?

Negative Capability

In the absence of a *theory of everything* and with some evidence that such a theory is not anywhere near forthcoming (given the modest scientific claims mentioned here) or even desirable (from the commentaries of Tallis (2013) & McGilchrist (2012) for instance), we may be better advised to seek to cultivate the skill of what has been called by the poet John Keats, Negative Capability:

Negative Capability, that is, when a man is capable of being in uncertainties, mysteries, doubts, without any irritable reaching after fact and reason—Coleridge, for instance, would let go by a fine isolated verisimilitude caught from the Penetrarium of mystery, from being incapable of remaining content with half-knowledge ('Negative Capability', n.d.).

The perspectives of objective science and subjective experiential meaning-making make different assumptions and live in different worlds of meaning, similar each perhaps to Keats 'half-knowledge'. *Negative Capability* is not meant as a term of limitation - in fact it is a source of creativity and opportunity for new insights. As discussed, it is possible to build bridges of association between these perspectives, and these correlations have the potential to better steer therapy by giving us feedback in ways which previously did not exist, like the benefit of radar, seeing into the clouds to produce a more helpful map.

CONCLUSION

The original intent of mindful therapy—to reduce suffering in human experience— is of course a worthy goal, and it has proven successful in a qualified way by delivering this within clinical contexts, such as via MBSR programmes. Its shortcomings in defining exact terms and highlighting risks (for instance around previous trauma), whilst understandable in the historical context, are now coming under more scientific scrutiny, and adaptations are being tested such as trauma-sensitive mindfulness (Treleaven, 2018) and Compassion Focused Therapy (Gilbert, 2010). Recent cross-disciplinary research has helped this and is steering practice and experimentation (towards areas such as biofeedback) and the importance of the (perhaps neglected) self-compassion component in mindfulness practice and therapy.

The disciplines of biological sciences and humanities make strange bedfellows. However, we can see that the benefits of cross-disciplinary research remain, even if the two epistemologies fail to neatly coalesce. We can thus anticipate that future research in this still very young science will significantly alter the manner of delivery for mindful therapies in constructive ways.

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