Vipassana for Hackers

The Proposal

Version 0.1

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Vipassana meditation claims to ultimately explore the entire field of mind and matter, with the goal of total liberation from suffering. Implicit within this claim is a complete understanding of human consciousness. This is a difficult claim to prove or disprove because the time commitment required to research the technique orders on multiple decades — if not multiple generations. Only a longitudinal study has any meaning. This is complicated by the fact that the time commitment is demanded of both the researcher *and the subject*. Until now, research on meditation of all kinds has covered only one of two fields: (1) controlled experiments which must inherently rely on superficial data gathered from beginners [10, 15, 16, 24] and (2) observational exploratory research of monks — expert meditators who have dedicated their lives to the practice. [11, 21]

I propose bridging this gap by submitting myself to the middle ground. While remaining a layperson, I will commit to a high ratio of waking medition hours. Individually and internally, I will conduct qualitative research into the consequences of Vipassana meditation and the nature of consciousness. Collectively and externally I will pledge myself as a subject for long-term quantitative studies with a broader community of researchers.

Keywords: neuroscience, psychology, vipassana, meditation

TODO LIST

I. INTRODUCTION

Research into the effects of meditation has been conducted in earnest for half a century but the quality of research in this field varies wildly. Randomized controlled trials were missing from much research conducted during the first few decades of meditation study. The importance of active controls was often missed even when randomized controlled trials were attempted. Double-blind studies are inherently impossible with meditation research; a subject will always know if she is receiving meditation instruction or an active control instruction. [17]

Add to these difficulties the very nature of meditation research itself. There are many techniques of meditation and it is very important to capture the specific technique under study to make meaningful assertions about its effects. [17] However, even within the definition of a single meditation technique there exist variations in instruction between teachers and each student's comprehension of the instructions received. [8] Even if researchers could cement (or at least accurately record) semantics and terminology, the subject of study is often unclear: Are we looking for health benefits? Increases in productivity? Increases in intelligence? How long these effects persist? How much do we want to explore concrete hypotheses versus exploratory analysis of long-term effects? How much can be learned about the nature of consciousness? Can these learnings be measured objectively or even communicated meaningfully?

Because Vipassana [1] is globally standardized, it affords researchers with definitive solutions to the difficulties presented by varying teaching methodologies. In exchange for this, the difficulty of long-term study is compounded by the intrinsic seriousness demanded of a Vipassana practitioner: the Pāli concept of *ātāpī sampajāno satimā* (continuous piercing awareness of constantly changing bodily sensation [1, 13]) is not only a requirement of serious Vipassana practice but could very well act as a surrogate description of the practice itself. This seriousness poses obvious difficulties and it is the intention of my study to begin breaking ground in solutions to those difficulties.

This study will prove significant in three fields of research:

First, and most accessible, is the continued quantitative research of meditation in the broader neuroscience and psychology disciplines, where my participation will be more as subject than researcher.

Second is the qualitative research into the long-term consequences of Vipassana meditation, what it reveals

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[1] For the remainder of this research proposal, "Vipassana" will always refer to the specific technique "Vipassana as taught by S.N. Goenka in the tradition of Sayagyi U Ba Khin" and lineage-identical instruction, such as that taught by Ledi Sayadaw (in writing) or other students of U Ba Khin contemporary to S.N. Goenka, unless noted otherwise.

about the nature of human consciousness, and reusable techniques for its exploration — a field currently consisting of a bridge between psychology, philosophy, linguistics, and contemplative studies.

Third is the exploratory research intended to objectively define consciousness. As such research must pertain to all forms of consciousness it therefore includes all non-human forms of consciousness. Findings will inform our understanding of the Mind-Body Problem of psychology and philosophy, the entire field of bioethics, and — perhaps most importantly — the nascent field of Artificial Consciousness as a subfield of Artificial Intelligence. [19] As of this writing, this overarching integral field of study has yet to emerge and has no name as a discipline.

II. PROBLEM STATEMENT

There is a dearth of high-quality scientific meditation research. Due to decades of misunderstanding the subject, it's estimated that — of the 50,000+ papers published on the broad topic of "meditation" — only a few dozen conform to scientific rigour. [12, 17]

There are exceptions. Notably, Richard Davidson's 2002 study on Minyur Rinpoche and the subsequent EEG and fMRI studies of serious Tibetan monks. [21] There have also been effective double-blind trials of householders (the laity), predominantly studying Mindfulness-Based Stress Reduction (MBSR) and Mindfulness-based Cognitive Therapy (MBCT), which represent two very mild techniques of meditation.

Sampling from the extremes is a natural consequence of the accessibility of subjects. Contemplative monks, serious in their meditation practice, are not easily accessed. Modern householders tend to peak at 2 or 3 hours of meditation per day, due to other responsibilities. This is the dichotomic choice in meditation research: either sporadically studies monks, who can have tremendous meditative capacity — or regularly studies householders, who have little to none.

Bridging this monastic / householder divide requires individuals willing to (a) dedicate themselves to long periods (years or decades) of continuous meditation practice with a single technique and (b) submit themselves to continuous scientific inquiry.

A. Overview

B. Hypothesis

III. OBJECTIVES AND AIMS

A. Overall Objective

B. Specific Aims

IV. BACKGROUND AND SIGNIFICANCE

A. Preliminary Research Review

- summary of related research - strengths and weaknesses - justification — what hasn't been done by others? — why is this research necessary?

B. Why Vipassana?

1. "complete", standardized, global, multilingual, 100% free 2. mundane (sleep) vs. supramundane (total eradication of suffering)
3. who is steven deobald

C. Why now?

V. RESEARCH DESIGN AND METHODS

A. Overview

As the structure of studies conducted on Vipassana is inherently very difficult, due to the strict nature of Vipassana meditation instruction, we must first examine which kinds of studies are possible, which are not, and what will make possible studies worthwhile.

1. Expertise

A large scale controlled study of beginner-to-intermediate students of Vipassana, each practicing a minimum of two hours daily, is possible. Randomization will not be possible in such a study as the students self-select this meditation technique for themselves. The recommendation to practice the technique "a minimum of two hours daily" is a component of instruction, given to students even on the most basic 10-day introductory course. [3, 14] As such, it is possible to conduct such a study on students who have dedicated themselves to the practice of Vipassana in the manner recommended — and an increasingly large number of Vipassana meditators do so, worldwide.

However, such a study suffers from the very nature of the instruction and its target audience. On the lifelong scale of Vipassana practice, the spectrum spans from a minimum of laypeople practicing two hours per day to a maximum exemplified by renunciates (monks and nuns) who practice up to twenty-four hours per day once they reach the advanced stage where deep sleep no longer occurs. It is also worth noting that a junior renunciate will still have less *experience* than a senior lay meditator, which means that the only objective measure of experience is total number of hours meditated. [17]

Meditation research often has difficulty defining and capturing *expertise*, however, and total hours of experience is still confounded by the rate in which those hours of experience are accumulated (hours per day). We must capture both, as accurately as possible. Renunciates potentially have both a high hours-per-day rate and extended (lifelong) duration of experience. The existence of renunciates forces the very broad category of *expert* meditators into the terrority of 100,000 hours of practice, even if we limit practice hours to formal, sitting meditation and estimate twelve (12) hours per day. If we take the much more modest rate of six (6) hours per day, assume an adult renunciate can learn Vipassana, at the earliest, from approximately 20 years of age, and is now of an age when they may participate in an extended study (say, 40-60 years of age), we arrive at roughly 60,000 hours of practice. We can reduce this number to 50,000 to match the upper-bound of groups categorized in studies by Lumma and Brewer. [5, 20] If we use the oft-cited "10,000 hours" measurement for competence in a subject, we might reasonably describe our rough spectrum of expertise as such:

- Beginner: 0-10,000 hours
- Intermediate: 10,000-50,000 hours
- Expert: 50,000+ hours

As a consequence, even studies which claim to observe "expert" or "long-term" Vipassana meditators are often predominantly observing beginners (7.9-8.6 mean years of experience with 2 hours of daily practice). [6]

2. Methodological Issues

This is in addition to a large number of other methodological issues with studies of Vipassana, as described by Alberto Chiesa in *Vipassana Meditation: Systematic Review of Current Evidence*, 2010. [6] These include the lack of: study replication, randomized trials, active plus inactive controls, and double/single blinding.

Chiesa also notes that it would be beneficial to capture data "both from a clinical and from a neuro-imaging point of view", including functional magnetic resonance imaging (fMRI) and electroencephalography (EEG), for both short-term outcomes (altered states) and long-term outcomes (altered traits [7]) to improve future Vipassana research. [6] Optically-pumped magnetometer (OPM)-based magnetoencephalography (MEG) performed using a mobile helmet capable of operating at room temperature [4], in development since Chiesa's paper was published, may permit it as a third neuro-imaging technique. Even older MEG technology based on superconducting quantum interference devices (SQUIDs) could potentially be used. The restriction of SQUID-based MEG is that subjects must remain extremely still, but this is all but a requirement of serious Vipassana meditation anyway.

Because Vipassana does not permit any form of imagination, any attempt to analyze it through philosophical phenomenology becomes a hindrance to actually practicing Vipassana. [22] The two are mututally exclusive, as is any attempt to contemplate Vipassana, the phenomenology of the mind, or the technique, during the actual practice of Vipassana. I have previously discussed this apparent paradox in Appendix A of *Vipassana for Hackers, Paper One: Curious Mechanics*. [9]

Last, statistical study of Vipassana, at the intermediate level, is currently not possible. Meditators who are in the process of transitioning from 10,000 hours of experience to 50,000 hours of experience are not readily available as research subjects in significant numbers. Because we have not studied such meditators, we are as of yet not exactly sure what we might be studying when we do study them. V.S. Ramachandran put this most succinctly:

> "I can't think of a single discovery of disease which had more than one initial sample. ... You can't do statistical analysis of an initial discovery." [23]

3. Meditation as Research Tool

A lifelong study of a single, increasingly-experienced Vipassana meditator is, in essence, an exploratory process of discovering what researchers might be bothered to study in a controlled trial with both active and inactive controls and (single) blinding, over a much larger sample. This exploratory process has been described by Goleman and Davidson in *Altered Traits*:

> "Perhaps one day an ultralong study will give us the equivalent of video on how altered traits emerge. For now, as the Brewer group conjectured, meditation seems to transform the resting state—the brain's default mode—to resemble the meditative state.
>
> Or, as we put it long ago, the after is the before for the next during." [17]

The demands of such an "ultralong study" were echoed by Harari in *21 Lessons for the 21st Century*:

> "Some universities and laboratories have indeed begun using meditation as a research

> tool rather than as a mere object for brain studies. Yet this process is still in its infancy, partly because it requires an extraordinary investment on the part of the researchers." [18]

The line between "mere object for brain studies" and "research tool" begins to blur when we consider using meditation for both simultaneously. However, we would be remiss not to gather whatever objective EEG/fMRI/MEG data from the long-term subject-researcher when that data is so readily available.

4. Summary

Because Vipassana meditators are inherently self-selecting, double blind trials are not possible, nor are randomized trials. Single blinding is possible, and should be employed in future studies where it is feasible. Combination active/inactive controls are also possible for all *statistical* studies on Vipassana.

The study proposed is an ultralong (lifelong) study of an individual — myself. There is potential for others to join this ultralong study, should it show promise. As far as quantitative data gathered from brain scans is concerned, I am effectively making myself available as a human guinea pig. As far as qualitative data is concerned, research will take the form of a deep case study. As I will represent Ramachandran's "initial sample", statistical analysis will not be relevant. If the study proves productive, future studies targeting a specific hypothesis about Vipassana in a large sample can use learnings from this study in their statistical structure.

B. Study Design

1. Qualitative

Qualitative research into the specific nature of human consciousness or the broader nature of consciousness as it applies to any organism or artificial intelligence can only be performed directly. In this case, a case study performed by an individual (myself) will explore the question of consciousness and the mind-body problem directly, through Vipassana meditation, for a prolonged period of time. Many theories and questions currently exist regarding consciousness, such as *Theory of Mind*, *Theory of Panpsychism*, *Theory of the Entropic Brain*, the *Simulation Hypothesis*, etc. This study will not address any one of the many theories of consciousness directly, nor will it absorb any specific hypothesis. The data recovered from practicing Vipassana meditation directly for prolonged periods of time will almost certainly overlap with many such ideas but themes and narratives are likely to be emergent, rather than conforming to an existing hypothesis of consciousness.

Phenomenology, in the broadest sense, may be used to describe experiences as they pertain to a lifelong trajectory of altered traits. Phenomenological descriptions of deep meditative states, or even of altered traits, is not the goal, however. If other narrative tools emerge over the course of the study, I will augment phenomenological descriptions and imagery with those tools.

Vipassana's instruction provides us with claims we can evaluate: "[Vipassana] explores the entire field of mind and matter" [13], "[Vipassana] is a technique that will eradicate suffering" [2], and "Vipassana aims at ... total liberation and full enlightenment" [2]. Progress made in evaluation of these claims will be, by its very nature, emergent.

The validity of these emergent observations made during the qualitative portion of the study can be asserted across most axes of validity: prolonged engagement, rich descriptions, external audits (from more experienced meditators), identification of researcher bias, peer debriefing (again from more experienced meditators), and searching for discrepancies in evidence are all possible. Respondent validation (member checking), although possible, may not carry much weight in terms of strengthening the validity of the study, given an initial sample of one. Triangulation will not be possible with a sample of one. If the study proves productive, in the future additional researcher-subjects intent on a lifelong Vipassana practice may strengthen respondent validation and triangulation for parallel studies. Triangulation of qualitative analysis of consciousness suffers from the paradox that any individual's consciousness is only directly observable by that individual and conclusions — even those validated by triangulation — will always be in the third-person.

Data will be collected on a daily basis and themes and narratives regularly collected with the intention of describing mental phenomena and the evolution of traits as Vipassana practice progresses. Monthly or yearly schedules will be decided with a study supervisor but an example daily schedule (subject to change) is available in *Appendix 1: Example Daily Schedule*.

2. Quantitative

Measurements performed during the lifelong qualitative study

05:00 - Wake
05:30 - 1 hour meditation
06:30 - Breakfast
07:30 - Exercise
09:00 - 3 hours meditation
12:00 - Lunch
13:00 - 3 hours meditation
16:00 - Writing period
18:00 - Evening meal
19:00 - 1 hour meditation
21:00 - Sleep

It is worth noting that this schedule generally persists across weekends and contains flexibility for longer or shorter writing periods.

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