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- Letters To The Editor
- Ayahuasca Tea in the United States: Why and how?
- Towards Consilience Between Research Paradigms and Spiritual Practice



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Letters To The Editor

The American Society of Ketamine Physicians, Psychotherapists & Practitioners (ASKP ^[3]) writes to acknowledge the publication of the *ethical guidelines* proposed by Raquel Bennett, PsyD, and Wesley Ryan, MD in *Ethical Guidelines for Ketamine Clinicians*. Dr. Ryan is a private practitioner in California. His commentary sets forth his beliefs and opinions regarding the use of ketamine for mood disorders. There are several good points in this document, many of which echo the ethics statement previously created by ASKP ^[3]. We first introduced our ethics statement and standards of care at our annual conference on October 15, 2020. ASKP's board, which consists of members from various specialties and backgrounds, drafted our ethics statement. Over 300 members of ASKP ^[3] reviewed our statement in August 2020, provided comments leading to revision, and the final draft was unanimously adopted on October 15, 2020, at our annual meeting.

ASKP's ethics statement, states that all clinicians shall maintain all necessary professional licenses in good standing and practice within the scope of their license, education, training, study, or professional experience. We also agree on the importance of continuing education. Clinicians should continue to study, apply, and advance scientific knowledge, maintain a commitment to continuing education, make relevant information available to patients and collaborate with colleagues, and utilize or consult with other health professionals when appropriate. ASKP ^[3] understands and is committed to transparency in treatment as well as full disclosure and consent from patients.

ASKP ^[3] disagrees with Dr. Ryan's contention that only psychiatrists are

adequately trained to obtain informed consent for ketamine therapy. The reality is that no one specialty understands all the dimensions of ketamine treatment. It is an old FDA-approved anesthetic that has been discovered to be a remarkably effective treatment for certain psychiatric conditions. There is no comprehensive residency program whose curriculum includes all of the skills required of a practitioner treating patients with this medicine. In fact, Stan Grof, MD, a psychiatrist who pioneered psychedelic-assisted psychotherapy, has highlighted how much psychiatrists have to unlearn to support this new field ^[1]. Presently, the preponderance of behavioral health care in the United States is rendered by professionals other than psychiatrists. A collaborative approach to advancing the science and craft of ketamine therapy will best serve patients and the public. According to Drs. Singh and McShane, early contributors to this field, "Clinicians...should have a heightened degree of humility and responsibility ^[2]." This model is currently being used effectively in other areas of psychedelic medicine. For instance, with the use of MDMA treatment for PTSD, standards are being developed by the Multidisciplinary Association for Psychedelic Studies; MAPS includes and trains practitioners who are not specialized in mental health.

Additionally, Dr. Ryan asserts that suicides are more prevalent in clinics where the practitioners are not trained per his recommendations. There is no evidence for this in the scientific literature. Regrettably, suicides occur in all types of psychiatric and other behavioral health practices. For example, several suicides were completed during the recently published Spravato trials. This is the largest cluster of suicides in any cohort of

which we are aware. These medication trials were designed and conducted by highly qualified psychiatrists. The author has no evidence for the claim that suicide rates are higher in one type of practice. The notion of “sub-par” qualification implies that there is a standard. There are no such standards at present. The ASKP³ is currently collaborating with different professionals to develop standards and certifications. Publishing claims that suicide is more common in “subpar” ketamine practices is not based in evidence, trivializes real challenges in suicide prevention, obscures the high value of ketamine treatment for suicidality, true, and could lead to reluctance among providers to offer ketamine. This would be a tragic outcome. Dr. Ryan asserts that he is trying to expand access to this potentially life-saving treatment. Regrettably, he calls for restricting ketamine. This statement should be retracted until evidence-based, peer-reviewed data are available.

Our organization is witness to many types of practitioners doing incredibly valuable work for the betterment of patients, especially given the current shortage of psychiatrists in our country^[3,4]. We intend to protect the ability of all types of physicians, psychotherapists, and practitioners to continue to practice, contribute, and excel in this work provided that they remain committed to quality improvement and continuing education. We believe this collaborative, open, and interdisciplinary approach will produce the best outcomes for the largest number of patients.

Sincerely,

American Society of Ketamine Physicians,
Psychotherapist and Practitioners:

Megan Oxley, MD, Emergency Medicine
Sanhyda Prashad, MD, Psychiatry
Robert M Grant, MD, Internal Medicine
Steven Mandel, MD, Anesthesiology

Lisa Harding, MD, Psychiatry
Patrick Sullivan, DO, Emergency Medicine,
Cindy Van Praag, MD, Anesthesiology,
Nykol Rice, CRNA
Rena Beyer, LCSW

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We have read with interest the recent establishment of Ethical Guidelines for Ketamine Clinicians by Dr. Raquel Bennett and the related commentary by Dr. Wesley Ryan. We want to offer our experience as anesthesiologists also practicing psychedelic medicine.

Let us start by agreeing wholeheartedly with Drs. Bennett and Ryan in their positions that the practice of psychedelic medicine requires a multidisciplinary approach. That approach should incorporate principles from medicine, psychology, philosophy, spirituality, and neuroscience. We established the Satori Ketamine Clinic in 2019. Our city, St. George, is a small town in Southern Utah that did not have a ketamine clinic or even the availability of electroconvulsive therapy. We started the clinic based on the request of several patients who had treatment-resistant depression and after consultation with local psychiatrists who were not familiar with the therapy.

From day one, our motto has been to provide ‘meaningful ketamine therapy.’ We had seen unscrupulous ketamine providers in Northern Utah, and we did not want to replicate the environment they had created— such as lack of integration, predatory advertising, and unsupervised treatments. With limited resources for psychedelic medicine training, we embarked on a journey of education to provide a comprehensive, integrated ketamine treatment program.

We acknowledge that our anesthesiology training lacked the adequate psychotherapy training required to provide comprehensive psychedelic therapy, however, most other specialties including psychiatry and psychology training programs also provide limited exposure to training on psychedelic therapy. Anesthesiologists are adept at manipulating non-ordinary states of consciousness, guiding patients through difficult times, and are familiar with traditional psychedelic medications such as Ketamine. As more knowledge is gained about the utility of the

mystical experience, the art of real-time medication administration with multiple compounds will prove useful. The integration of diverse fields of medicine and psychology will likely result in synergistic outcomes as psychedelic therapy becomes more mainstream.

The most rewarding discoveries of psychedelic practice have been the relationships we've developed with psychiatrists and psychotherapists. Through these relationships, we have been able to offer integration services to provide long-lasting and meaningful transformative changes in patients' lives.

Our philosophy is that each ketamine session should be a sacred experience. At our clinic, a physician or licensed mid-level provider (nurse practitioner, physician assistant, or certified registered nurse anesthetist) administers the medicine and sits with the patient during the ketamine session. At no time are patients left alone and psychological support is provided before, during, and after each ketamine treatment. We consider it unethical to leave patients alone in a room during ketamine treatment and feel strongly that the practice of leaving multiple patients unattended should be discouraged. A financial reward should never be pursued at the expense of any patient's physical or psychological safety.

We also agree with the concept of providing therapy for patients who cannot afford regular fees. We have partnered with the local Doctor's Volunteer Clinic to provide steeply discounted therapy for selected patients as our way of giving back to the community. We hope this practice can be followed at other ketamine clinics and/or programs to assist the underserved populations can be created.

We look forward to the establishment of consensus guidelines regarding home ketamine use. While useful in limited settings, we've had patients present with ketamine use disorder and interstitial cystitis. In our practice, we

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prescribe ketamine only for use in a therapist's presence, as part of ketamine-assisted psychotherapy, or medically delivered during a session in the office.

In sum, the establishment of ethical guidelines and training programs is a welcome addition to the psychedelic therapy world. We are excited and humbled to play a small role in this transformative field.

Sincerely,

Scott Allen, MD
Rachel Allen, MD
St. George, Utah

Ayahuasca Tea in the United States: Why and how?

LJ Standish ND, PhD; Juan Giménez PhD; and Victoria G Hale, PhD

Abstract:

Ayahuasca Tea is available through numerous venues. We are developing traditional Ayahuasca Tea for the group treatment of several mental health indications, including major depression, anxiety, addiction, PTSD, and unresolved grief (U.S. FDA path). We are engaging with Amazonian traditional Ayahuasceros and shamans to learn how best to develop this medicine with respect for indigenous healing rituals. Our research group has chosen to develop traditional Ayahuasca Tea—as opposed to synthesized alkaloids, or what is known as "pharmahuasca." Challenges inherent in botanical drug development as well as historical, cultural, and legal issues are discussed. The concept of reciprocity is introduced, and the Ayahuasca Tea reciprocity imperative is discussed.

Disclosure:

LS, JG, and VH are employees of Sacred Medicines, a mission-driven Delaware Public Benefit Corporation

INTRODUCTION

We are developing Ayahuasca Tea (FDA path) for the group treatment of a number of mental health indications, including major depression, anxiety, addiction, PTSD, and unresolved grief. Our goal is to provide potent and contaminant-free Standardized Ayahuasca Tea. We produce the Tea based on traditional South American ethnomedical methods of combining the vine of *Banisteriopsis caapi* (monoamine oxidase [MAO] inhibitors) and the leaves of *Psychotria viridis* (dimethyltryptamine [DMT]). We are committed to developing Standardized Ayahuasca Tea for clinical, neuroscientific, and consciousness science research.

The FDA has granted Breakthrough Drug Designation to MDMA and psilocybin based on Phase 2 clinical trial results for PTSD and depression, respectively. Psychedelic medicines are poised to contribute significantly to the psychiatric pharmacopeia, as many new companies have formed in this new sector: <https://money.usnews.com/investing/stock-market-news/articles/more-psychedelic-companies-are-going-public>

The psychedelic medicines currently in development are synthetic monotherapies (MDMA, psilocybin, LSD, ibogaine, mescaline, 5-methoxy DMT). The development of psychedelic combinations can be expected to

follow after FDA approval of monotherapies; Ayahuasca Tea is a combination of psychedelic and, to our knowledge, is the only botanical psychedelic being developed through FDA.

We take this opportunity to explain some differences between the botanical Ayahuasca Tea and synthetic (chemical) psychedelic medicines. We believe that Ayahuasca Tea offers a uniquely holistic experience: whole plant medicine, ceremony, group administration of medicine and group psychotherapy, shamanic practitioner facilitation, an extended immersive experience, all drawing from centuries of indigenous use. Our goal is to support the introduction of Ayahuasca Tea into Western society while respecting and honoring its origins and indigenous traditions.

TRADITIONAL USE

Ayahuasca Tea is a sacred indigenous medicine used for physical and spiritual healing. The psychoactive plant preparation is indigenous to the peoples of the Amazon basin. The plants that comprise the tea were found in a 1,000-year-old pouch in Bolivia (radiocarbon dating), representing the earliest known evidence of Ayahuasca preparation ^[1]. Further, we know that Catholic priests went to extreme measures to limit access to Ayahuasca

in South America in the 17th and 18th centuries [2], providing more evidence that this medicine has been used for centuries. Currently, in 2021, we engage with traditional Amazonian healers (Ayahuasceros, Shaman, Taitas) in order to adapt and optimize the provision of this offering to Westerners, balancing respect for indigenous culture with feasibility and acceptability to FDA.

AYAHUASCA HUMAN USE OBSERVATIONAL STUDIES

While Ayahuasca Tea has been well-studied, most, if not all, research has been conducted outside of the U.S. A 2021 PubMed search revealed 240 peer-reviewed publications on the use of ayahuasca in humans that included 23 randomized controlled trials in 329 human volunteers, 11 observational studies involving 2300 people, studies of the pharmacology, EEG, fMRI, and psychological effects of Ayahuasca Tea, including three observational studies of 152 adolescents who participated in Ayahuasca Tea ceremonies in South America.

The safety of Ayahuasca Tea in group ceremonies has been well established in multiple studies conducted in South America, where ayahuasca is legal. The Hoasca Project was the first study conducted to assess the long-term effects of Ayahuasca Tea in humans [3]. From 1991 to 1996, the multinational cooperative effort involved researchers from nine universities and research institutions from Brazil, the U. S. and Finland. Psychological assessment of 15 long-term members of the União de Vegetal Church that utilizes Ayahuasca Tea as a legal, psychoactive sacrament as well as 15 matched controls with no prior history of Ayahuasca ingestion. The team reported the remission of psychopathology following the initiation of Ayahuasca use along with no evidence of personality or cognitive deterioration.

Subsequent studies have confirmed the safety of Ayahuasca Tea when used in a ceremonial setting. Bousa et al. [4] studied Brazilian Ayahuasca church users (N = 127) in order to measure the impact of repeated Ayahuasca use on psychological well-being, mental health, and cognition, in regular and controls (n = 115) at baseline and one year later. Controls were active participants in non-Ayahuasca religions. Users showed higher scores in Self-Transcendence and lower Harm Avoidance and Self-Directedness. The study found no evidence of psychological or mental health deterioration or cognitive impairment in the Ayahuasca group.

Spanish researchers studied 380 long-term participants in Ayahuasca Tea ceremonies in Spain and reported that long-term use of ayahuasca was associated with higher self-reported health and lifestyle. Those who drank Ayahuasca Tea more than 100 times scored high in self-reported mental health again showed reductions in depression and improvement in mental health [5,6].

Multiple observational studies conducted on diverse groups of ceremonial Ayahuasca Tea drinkers suggest that this therapy may reduce alcohol and drug addiction [7].

AYAHUASCA TEA AND DEPRESSION

An open-label clinical study found significant therapeutic benefits among patients with treatment-resistant major depressive disorder [8], even after a single dose of ayahuasca in patients with recurrent depression [9]. Palhono-Fontes et al. [10] reported rapid antidepressant effects of ayahuasca in treatment-resistant depression in a placebo-controlled randomized controlled trial conducted in Brazil (N = 29). The anxiolytic effects of the Tea have also been documented [11,12].

WHOLE PLANTS

We are undertaking the challenge of botanical drug development through the FDA because we believe in the principle of whole plant medicine, perhaps better known in the US with Traditional Chinese Medicines. Plants have polymolecular profiles with hundreds, if not thousands, of bioactive molecules. We hypothesize that the biological and psychological effects of Ayahuasca Tea made from two different species of plants differ and are more complex than simply DMT and harmine. Similarly, we hypothesize that the biological and psychological effects of whole *Psilocybe* mushrooms fruiting body and mycelium differ from and are more complex than the molecule psilocybin. Interestingly, harmine has recently been discovered in *Psilocybe* mushrooms [13].

The first step in our work was to study with and learn from traditional Ayahuasca healers to cultivate and sustainably harvest the two plants. We make the Tea based on traditional South American ethnomedical methods of decocting the vine of *Banisteriopsis caapi* (harmala alkaloids such as harmine) and the leaves of *Psychotria viridis* (DMT); when mixed in a hot water decoction, these produce Ayahuasca' Tea.' It is a challenge in the 21st century to improve on the established method of preparation developed by indigenous healers who have successfully used this medicine for centuries.

There exists a body of data demonstrating that DMT alone shows significantly different pharmacodynamics when compared to the DMT-containing plant brew [14]. The *entourage effect* is postulated as a viable principle applicable to cannabinoids' effects on the endocannabinoid system [15,16,17] and *Psilocybe* mushrooms [18]. The synergistic and multi-targeted actions of complex plant preparations may modulate the delivery, efficacy, pharmacokinetics, and toxicity of single constituents [19].

An example of the potential for synergism when comparing *B. caapi* extracts with isolated harmine and harmaline was reported by Schwartz et al. [20], who measured *in-vitro* dopamine release from rat striatal slices and inhibition of MAO-A activity. *B. Caapi* extracts produced a significantly higher signal in both methods when compared to individual alkaloids used at the same concentration, suggesting a "synergism" among extract compounds or the presence of other active compounds in the extract. Standardized plant medicine formulations are required to expand the understanding of botanicals, so we are making standardized Ayahuasca Tea for U.S. clinical trials.

Similarly, we hypothesize that traditional Ayahuasca Tea, because its other constituents, including terpenes, flavonoids, tannins, catechins, procyanidins, and polysaccharides, have other salutary biologic consequences that would not be provided by DMT alone. Further research is needed to explore these hypotheses.

WHY NOT 'PHARMAHUASCA'?

Often, we are asked, why not just make pharmahuasca with pure chemicals DMT and harmine? Modern reductionistic western medicine has excelled at developing potent single-molecule drugs from plants (digitalis from foxglove, the statins from the fungus *Aspergillus terreus*, paclitaxel (Taxol) from the Yew Tree, morphine from the poppy, and up to half of the oncology drugs from various plants [21]. It is of interest to note that Marinol (dronabinol, enantiomer form (-)-trans- Δ^9 -tetrahydrocannabinol) has not been of significant utility for many patients relative to consumption of whole plant or oil extracts of cannabis.

Other companies are developing DMT alone, administered through various routes and rates of administration

(<https://www.technologynetworks.com/neuroscience/news/world-first-clinical-trial-explores-safety-and-efficacy-of-dmt-for-major-depression-343822>). Our path is to honor and invite the botanical complexity of a natural product because it has demonstrated efficacy in indigenous Amazonian communities for centuries. Plant medicines are not just quaint relics from the past, containing only one medically 'useful' substance.

PURGATIVE

One of the qualities that many people are familiar with is the purgative effects of Ayahuasca Tea. The Tea is known to be an emetic/purgative, and the nausea, vomiting, and diarrhea that occur are expected responses, not side effects. Longitudinal studies of users of ceremonial Ayahuasca Tea and have reported few adverse outcomes. Nevertheless, many Westerners view nausea and vomiting as an undesirable outcome to be avoided, while individuals who know this medicine well insist that vomiting is important [22,23]. In a Western context, does purging make the Tea unsafe? No. Traditional Ayahuasca healers and the Santo Daime and União do Vegetal Churches embrace these effects as providing both emotional and physical purging.

Does vomiting result in under-dosing of DMT? In most ceremonies, participants have the opportunity to drink multiple cups of Tea to direct and control the depth of their psychedelic experience. Will Westerners want to consume this purgative Tea? Some people will avoid the medicine because of its inherent nausea and vomiting—traditional Ayahuasqueros view vomiting as a core element of an Ayahuasca Tea treatment. Purging is viewed as a desired outcome that enables those who partake to discharge negativity through purgation and reset their lives [24]. We accept that catharsis is an important psychological element of the healing process, as

understood in the context of the indigenous tradition, and Dennis McKenna (personal communication) has suggested that the "biters" present in Ayahuasca Tea must be tasted in order to elicit the full therapeutic effect, including purging. The medical benefit of emesis has not been well explored and is underappreciated in the West. Because pharma-huasca typically does not induce purging [25], it may not exhibit this important therapeutic property.

MICROBIOME

The gastrointestinal effects of Ayahuasca Tea are unique among psychedelics [26]. The Tea impacts the human microbiome [27], and thus it may have beneficial effects in individuals with chronic diseases linked to dysbiosis. LJS has observed clinical improvement in people with chronic gastrointestinal disorders (including Crohn's disease, IBS, and ulcerative colitis) who have participated in Ayahuasca ceremonies. The Tea may also have direct immunological effects. For example, the DMT in the Tea binds to serotonin receptors present on the surface of T cells throughout the lymphatic tissue that surrounds the gut from mouth to rectum [28]. A grant to study microbiome effects of ayahuasca was recently awarded to a nonprofit that provides the Tea to American veterans with PTSD (<https://markets.businessinsider.com/news/stocks/ubiome-awards-grant-to-nonprofit-heroic-hearts-project-to-study-the-effect-of-psychedelic-based-therapies-on-the-gut-microbiome-in-veterans-with-mental-illness-1028030860>).

SHAMAN-LED SACRED CEREMONY

The platform that most people access to receive Ayahuasca Tea is a shamanic ceremony. We believe that this medicine is powerful not just because of its pharmacology but also shamanic healing, which is not well

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understood by western science. True shamans are of indigenous lineage, whereas so-called 'neo-shamanic' practitioners (Westerners) are often trained by these indigenous spiritual leaders [29]. Many people seek out Ayahuasca ceremonies for spiritual healing, another concept that is foreign to Western healers. We seek the finest South American traditional Ayahuasca healers (Taitas, Curanderos, Ayahuasceros) to work with us in order to certify capabilities and train Westerner shamanic practitioners to administer the medicine ceremonially in our group clinical trials. We view Ayahuasca Tea's therapeutic effects and the skillfully led ceremony as interdependent, though we appreciate the challenges, this may pose to the FDA. We believe that the healing potential of Ayahuasca Tea is potentially compromised by omitting a skilled ceremony leader, as he/she is a key aspect of set and setting.

GROUP ADMINISTRATION AND THERAPY

We consider the group aspect of Ayahuasca Tea ceremonies to be essential, and to the best of our knowledge, this medicine is the first psychedelic to be developed with the group model. The 12 Step Program for addiction recovery owes much of its success and its low cost in treating addiction using a daily group therapy model. Further, we envision significantly reduced cost to patients who participate in group medicine administration compared to single-subject sessions with 1-2 therapists. Research on the group effect of psychedelic therapy is already underway [30]. MEDICARE presently reimburses licensed credentialed clinical providers to provide group therapy. (<https://www.ehealthmedicare.com/medicare-coverage-articles/medicare-coverage-therapy-mental-health-services/>).

Most Ayahuasca Tea ceremonies are prefaced with an 'intention setting' in which each participant articulates their specific psychological or physical issue, hopes, and intentions for the ceremony. Imperial College researchers have developed and validated the 'Communitas Scale' in order to investigate the psychosocial mechanisms that are relevant to psychedelic ceremonies [31]. Inter-subject interactions among the group members predicted enduring positive changes in well-being and social connectedness. We endorse the practice of intention setting within groups prior to ceremonies and honor the essential role of group integration psychotherapy following ceremonies.

EXTENDED IMMERSIVE EXPERIENCE

Ayahuasca Tea provides a prolonged immersive experience due to selective, reversible MAO-A inhibition by harmala alkaloids such as harmine [32,33,34]. Without enzyme inhibition, the DMT half-life when inhaled or by intravenous (IV) administration is short, lasting only minutes [35]. Gallimore and Strassman [14] argue that the short duration of DMT effects makes it a poor method to study its psychological effects. High acute doses of inhaled or intravenous DMT typically produce delirium, and users are sometimes unable to recall details of the experience. We hypothesize that forming and retaining clear memories of the psychedelic drug experience is important for the therapeutic process and is facilitated by a longer experience with these medicines.

WHY SEEK FDA APPROVAL FOR AYAHUASCA?

We believe that the FDA path provides the best way to educate physicians and other health practitioners about the efficacy and safety of Ayahuasca Tea. As most other

Schedule 1 substances are pursuing the FDA path, clinicians and scientists will then have the ability to compare Ayahuasca Tea to other psychedelic medicines.

There are some risks associated with bringing ayahuasca through the FDA, including medicalizing a sacred medicine. As noted above, our development plans do not involve single patient medicine experiences; we intend to preserve the ceremony and shamanic practitioner aspects of this medicine.

Botanical drug development through FDA presents a lack of precedent of psychoactive whole plant medicine. The few examples of FDA-approved botanical drugs reflect the emphasis of modern drug development on single-molecule discoveries and the lack of plant chemistry expertise and interest among western drug developers. We believe that it is possible to entangle the sacred and the scientific without commodifying a powerful sacramental medicine.

Rescheduling of psychedelic medicines is encompassed in the FDA's review of these medicines at the NDA (New Drug Application) stage, all of which are now Schedule 1 substances. Failure to develop Ayahuasca Tea through FDA would likely leave the Tea with Schedule 1 status. Even when psychedelics are no longer highly controlled as Schedule 1 drugs, psychiatrists, psychiatric ARNPs, NDs, MDs, and DOs will want to prescribe FDA-approved medicines that they know are of high quality, potent, safe, and efficacious.

There are several reasons to pursue FDA approval of Ayahuasca Tea:

- U.S. psychiatry and mental health services will adopt psychedelic therapy options for their patients only after FDA approval.
- Insurance coverage generally requires proof of efficacy and safety through the FDA.

- FDA approval may reduce travel to South America, thus limiting carbon footprint and depletion of wild plants.

It is important to note that FDA approval of Ayahuasca Tea will not prevent the UDV and Santo Daime churches from serving Ayahuasca Tea in their religious ceremonies.

We know that plant medicine presents chemistry and standardization challenges. However, these are not insurmountable. FDA provides expert botanical medicine guidance to botanical drug sponsors. In December 2016, FDA released its updated 'Botanical Drug Development: Guidance for Industry' (<https://www.fda.gov/files/drugs/published/Botanical-Drug-Development--Guidance-for-Industry.pdf>). Bloomberg News states that FDA had more than 500 botanical applications pending in 2012, the majority derived from Traditional Chinese Medicine [36].

MEDICAL PLURALISM

We believe in medical pluralism. There will be and should be multiple access paths for psychedelic medicines in the U.S. All pathways are worthwhile. Americans have a choice of how, where, and with whom to receive Ayahuasca Tea, and options will only expand in the future:

1. Church Tea: within the two currently legal U.S. Ayahuasca churches, the Santo Daime and UDV. New non-denominational Ayahuasca churches are beginning to form in the U.S.
2. Decriminalized tea: traditional *legal* shamanic ceremony in the U.S, after the decriminalization movement expands.
3. Amazonian Tea: Adventurers will continue to travel to the Amazon basin for medicine journeys led by indigenous shaman and immersed in nature.

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4. Underground Tea: illegal Tea ceremonies are prevalent in the U.S. and will likely continue.
5. FDA approved Tea: Tea served in authorized U.S. clinics to groups of patients with psychiatric diagnoses (Ayahuasca Tea is investigational at this time).

MEDICALIZATION OF AYAHUASCA TEA

One could question why psilocybin is being developed by two companies (Usona.org and Compasspathways.com) when psilocybin mushroom decriminalization and legalization are spreading rapidly through the US. Likewise, will we need FDA-approved Ayahuasca Tea once psychedelic medicines are decriminalized? One reason to proceed with FDA development is to ensure the quality of the Tea served.

Kaasik and Kreegipuu ^[37] have determined that some Ayahuasca Tea served in the EU is counterfeit, mostly associated with neo-shaman ceremonies but not with EU churches. Some analogs of Ayahuasca vine (*Peganum harmala*, *Mimosa hostilis*) were substituted. Shockingly, 2 of the 102 samples contained moclobemide (a pharmaceutical MAOI), psilocin, high concentrations of DMT, and very low concentrations of *B caapi* alkaloids. We are developing standardized Ayahuasca Tea so that prescribers and users can know that their medicine is authentic and pure. Further, we intend to sell authentic Ayahuasca Tea in jurisdictions with appropriate decriminalization legal structures in place in support of harm reduction. We will offer an Ayahuasca Tea assay service in support of harm reduction efforts.

SUSTAINABLE AGRICULTURE

As the use of Ayahuasca Tea is expanding rapidly, and plant source sustainability is of

significant concern. A study published by the American Botanical Council in 2018 concludes that *B. caapi* (Ayahuasca vine) cultivation is necessary now for the viability of the vine due to its use in ritual ceremonies that are increasingly popular around the world (<http://herbalgram.org/resources/herbalegram/volumes/volume-16/number-7-july/a-preliminary-sustainability-report-of-ayahuasca-vine-in-the-peruvian-amazon/a-preliminary-sustainability-report-of-ayahuasca-vine-in-the-peruvian-amazon/>).

There is no evidence of plans for sustainable *B. Caapi* vine farming in the Amazon, so depletion of these invaluable species is inevitable as a result of its popularity with westerners. A sacred tropical plant preserves using Peruvian cultivars was created by three pioneering American visionaries, Kathleen Harrison, Terence McKenna, and Dennis McKenna, nearly 50 years ago on the Big Island in Hawaii. We exclusively source our plants from this resource that was specifically designed to alleviate the overuse and depletion of sacred plants in the Amazon basin.

RECIPROCITY

It has been suggested that developing Ayahuasca tea through the FDA may be *cultural misappropriation* of a sacrament, and we remain very sensitive to this issue. In 2008, the government of Peru declared ayahuasca a national treasure and "one of the fundamental pillars of the identity of Amazonian peoples." In 1992, the government of Brazil officially exempted ayahuasca and its constituent plants from their list of illegal drugs. The Convention on Biological Diversity adopted the Biodiversity Treaty in 1992 and was signed by 150 government leaders at the Rio Earth Summit (<https://www.cbd.int/convention/>)

We have instituted several reciprocity initiatives to address these assertions:

- Shamanic practitioner-led ceremonies
- A shamanic practitioner certification program designed by indigenous healers
- Community-designed and implemented local reciprocity programs
- A sustainable agriculture program in Hawaii

CONCLUSION

Ayahuasca Tea, served in a group ceremony, is being developed through the U.S. FDA for various psychiatric conditions. The tea ceremonies will be preceded by group intention setting and followed by group integration therapy with ayahuasca certified psychotherapists. Human Ayahuasca brain research will be facilitated by access to an FDA-approved standardized Ayahuasca Tea botanical drug formulation. Where possible, Amazonian Shaman is being engaged to advise on the development of this medicine with respect for indigenous healing rituals.

We suggest that there are two parallel modern scientific paths towards the study and clinical applications of psychedelic substances--single molecules and whole plant medicines. Whole plant botanical medicine is not old-fashioned. Plant medicines have an important scientific and medical future - right alongside reductionistic single-molecule medicine. Sacred plant medicines deserve to be scientifically validated, and the FDA route provides definitive proof of efficacy and safety.

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Towards Consilience Between Research Paradigms and Spiritual Practice

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Abstract:

Spirituality is widely recognized as a function of health, of wholeness, and in some fashion central to psychological healing. In recent decades western medicine has found renewed interest in the spiritual aspects of healing with the development of psychedelic-assisted psychotherapy, a form of treatment commonly observed to induce spiritual and mystical experiences. Questions about the role of the mystical experience in psychological healing have led to the desire to research the subject. However, this state is well known to be difficult to study objectively due to its ineffable quality, problems with defining terms, and apparent theoretical and philosophical differences from research paradigms. This paper attempts to find the most fundamental common theoretical ground possible in order to attain consilience between research as it is performed and the spiritual experience towards the goal of improved theory and better treatment designs and clinical outcomes. This is done by conceptualizing the spiritual experience as a homeostatic mechanism to optimize the various codes of life. This places the spiritual experience in the same framework as other aspects of the social and biological sciences. As a special case, the mystical experience is conceptualized as associated with directly accessing codes created through early childhood social learning. Boundary cases and counterintuitive implications of this paradigm are discussed.

Keywords: Research, spirituality, mystical state, psychedelic-assisted psychotherapy

INTRODUCTION

Edward O. Wilson, evoking William Whewell, observed, "The greatest enterprise of the mind has always been and will always be, the attempted linkage of the sciences and humanities. The ongoing fragmentation of knowledge and resulting chaos in philosophy are not reflections of the real world but artifacts of scholarship.... Consilience is the key to unification.... Literally a 'jumping together' of knowledge by the linking of facts and fact-based theory across disciplines to create a common groundwork of explanation. A consilience of inductions takes place when an induction, obtained from one class of facts, coincides with an induction obtained from a different class. This consilience is a test of truth of the theory in which it occurs ^[1]."

Research into psychedelic-assisted psychotherapy seeks to explore the treatment

of disorders, during which spiritual and mystical subjective experiences are commonly observed to understand the mechanism of change and improve outcomes using these methods. Medical research is commonly understood to involve the scientific method, which collects objective data under controlled conditions. As will be explored in this paper, subjects engaging in psychedelic-assisted psychotherapy commonly report spiritual or mystical experiences, states that are known for their ineffability. Thus, some issues with obtaining reliable, objective data are observed, at least beyond that obtained through psychometric inventories of subjective states. While inroads into the question of this relationship, of the spiritual experience to healing in the context of entheogen use, are being made, much remains to be determined. It would seem that somehow the scientific method tends to be a very ill-suited tool to

explore much of what is described as the spiritual experience and related concepts, given also very different theoretical and philosophical soils that they are rooted in.

If one could find common ground in their underlying philosophies, it would help determine a language of use common to spiritual matters and the scientific method of determining knowledge. Ideally, this common ground would stunt neither side in some conceptual procrustean bed and could potentially allow for the spiritual experience to be analyzed more deeply and by a wider array of scientific tools than is currently achieved.

DEFINITIONS

If a social psychologist, a Catholic priest, and a Zen monk were to walk into a bar and order a *Spiritual Experience* from the bartender, a quarrel might break out among them over just what the drink consists of. Given that the vocabulary pertaining to the spiritual experience is in widespread usage, definitions and concepts, as explained, should be readily obtained from the most easily available of references, so basic internet resources will be used for examples of definitions and explanations as retrieved at the time this paper was composed [2] and abridged for clarity.

The Merriam-Webster Dictionary Online defines *spiritual* as (abridged):

1. of, relating to, consisting of, or affecting the spirit: INCORPOREAL
2. of or relating to sacred matters
3. concerned with religious values
4. related or joined in spirit
5. of or relating to supernatural beings or phenomena

None of the definitions above could be used to measure anything objectively for research, except in the phenomenological sense of whether the subject says it is spiritual or not and perhaps some expressed degree of relative magnitude.

In attempting to describe *spirituality*, William A. Richards in *Sacred Knowledge* does not aim for a specific rigid definition, but notes, "Love, nobility, the creative yearnings to strive towards excellence and what we humans call "greatness" are manifestations of that part of the mystery of our being that we call 'spiritual.' The same is true of dedication and courage to care about human foibles and the commitment we make towards the resolution of personal, societal and international impasses [3]." It may be difficult to map that explanation to the dictionary definitions in a concise way. Among the definitions, perhaps "related or joined in spirit" would fit most closely. Elsewhere he notes some people would define *spirituality* as separate from *religiosity*. However, he disagreed with that in light of the definition of *religion* implied by its Latin root *religare*, "to ...signify what most profoundly binds us together and reflects a shared perspective on what gives life its deepest purpose and meaning," which he found to be deeply spiritual [3]. This does highlight that all do not entirely agree on the definition of the word. Jastrzębski explored the difficulty of attempting to make precise definitions, pointing out at least 40 definitions of spirituality [4].

An apparently less spongy concept is that of the *mystical experience*. The dictionary definition of *mystical* [5], however, is still not much of a help:

- 1a: having a spiritual meaning or reality that is neither apparent to the senses nor obvious to the intelligence
- 1b: involving or having the nature of an individual's direct subjective communion with God or ultimate reality
- 2: MYSTERIOUS, UNINTELLIGIBLE

Furthermore, as a term of art, it has been perhaps better described. William James described the elements of the mystical experience to include, Ineffability, a noetic quality or "insight into depths of truth unplumbed by

the discursive intellect," Transiency of the experience and the passivity of the Individual having the mystical experience [6]. Similarly, Robert K.C. Foreman described the *pure consciousness event*, which includes the core characteristics of *unity*, the *transcendence of time and space*, *intuitive knowledge*, *sacredness*, *deeply felt positive mood*, and *ineffability* [3].

On the other hand, research is dependent on careful definitions with high inter-rater reliability and reproducible results to help obtain better fundamental insights. Most scientific research is reductionistic and seemingly fundamentally at odds with the study of spiritual or mystical experience. Nevertheless, somehow, there remain unanswered questions about psychedelic-assisted psychotherapy, not least of which include delineating the role of the mystical experience in the mechanism of healing with this technique, as well as determining what spiritual practices on the part of the therapist may improve their effectiveness in delivering a healing experience. Because of this, there is potential value in attempting to bridge the paradox between the drug-facilitated mystical experience and the use of research to learn more about it.

The boundary conditions regarding spirituality would be important for an understanding of the concept. One question arises, analogous to the debate as to whether dogs have souls, namely, exactly who or what it is that can experience spirituality. This, of course, starts with defining what spirituality is, and an answer would be derived from the specific definition. Concreteness and specificity in the definition might be desirable. It seems intuitively obvious that humans are capable of spiritual life, and to some people, the question of whether a dog can be spiritual is an obvious yes, while others might stridently disagree. Is spirituality strictly the domain of human beings? What about AI? Like so many other cognitive and emotional properties once thought to be the sole domain of

humans, they have been observed in other species. Now, while no computer system has been able to fool all people in all circumstances to think that the system is, in fact, human, simpler versions of the Turing Test are passed by AI regularly, as evidenced by the yearly winners of the Loebner Prize [7], something like a spirit is being observed in systems not considered alive. Many science fiction stories have attempted to explore exactly that issue [8].

It is also clear that from the multitude of paths to choose from, a given path is not some universal truth *per se*. How does one hope to determine the validity of a spiritual path? Perhaps they are all equally valid, although it is not obvious why that would be, any more than allowing that they are *not* equally valid without some objective criteria to judge them.

Another question regarding the nature of spirituality is one of magnitude. Can a person have zero spirituality, and how would one know if that were the case? In that people undertake one *spiritual path* or another would suggest that Spirituality has a magnitude or degree that can change over time and person to person. Engaging in research means measurement. How is a researcher supposed to measure these things? The ideal would be to attach an electronic instrument to a test subject and measure how much spirituality they are radiating in some objective units that could be called perhaps *numins*. Such a measurement would be ideal for use in research, and by that standard, it would be a very desirable goal to achieve. People often judge others subjectively by the magnitude of their spirituality, so it would seem that humans do it informally, but at this time, finding a truly objective measure of the magnitude of spirituality is a lofty goal. An example of why it is so vexing is, again, people do not share a common definition of what constitutes spirituality; what is intensely sacred to one person is profanity to another. A worthy path to one

individual may well be irrelevant to another and carries no spiritual magnitude to them. If a common element to define spirituality were found for all cases, there could be hope for the desired consilience between research and spirituality.

One more pertinent concept that we all seem to know when we see it, but the definition of which is maddeningly hard to pin down is *life*. Central to all of this would seem to be the meaning of life, but how can that be determined when the current Wikipedia article on *Life* notes, "There is currently no consensus regarding the definition of life." It does, however, attempt the feat, as will this paper, at least in a narrow fashion, to find a common language to undertake research on spirituality, mystical experiences, and psychological healing.

Trifonov compiled 123 different definitions for *life*, consisting of "nine groups of defining terms (definientia) of which the groups (self-)reproduction and evolution (variation) appear as the minimal set for a concise and inclusive definition: Life is self-reproduction with variations ^[9]."

The definition to be suggested in this paper does suggest both evolution and self-reproduction, but only as implied, not overtly stated. It also may be substantially similar to definitions that invoke thermodynamics. However, approaches involving physics are also merely implied. It is designed to align itself with concepts found in biology and religious or spiritual concepts and recent concepts found in the study of self-organized complex systems, such as *cellular automata* and *artificial life*.

This paper's thesis requires the inclusion of two elements to be used to define spirituality that may be common to all life, even if not clearly proven to be necessary or sufficient for an actual definition of life—the existence of some instruction set and the machinery to carry it out. If viruses count as living things, the machinery can even be

borrowed or stolen. Further, the machinery in living things is most typically coded by the instruction set. Both of these conditions leave the identity for something living in the instruction set, the *logos*, but in this scheme, it is not alive until the machinery exists to carry out the instructions is available in some form or another. In this schema, life exists as a computation, functioning dynamically to optimize itself within its complex and ever-changing environment. This paper will develop a working definition for spirituality that also uses this concept.

The instruction set for a living thing does not have to all be in one place or time, and if that is the case, it would also necessarily be true of the machinery, given a part of the machinery would encode the instruction set and the instruction set would typically encode instructions to create the machinery. It also implies that different individual organisms may share both information and machinery, as can plainly be seen in the cases involving different hierarchical levels of life, including sexual reproduction or in colonies of cooperating people manifesting an organism called society. These nonbounded uses of instruction sets and machinery would imply that a paper and ink book is a part of life even if not alive itself, as it is an instruction set, but no mechanism is seen to exist in the book itself.

There may be more subtle implications of this definition of life. It is one of the definitions that does not require that the living thing is biological. Since John von Neumann first designed modern computer architecture, an operational computer has included an instruction set and the machinery to carry it out ^[10]. While a computer running a program may not itself evolve, it may, for instance, facilitate a cellular automata program, the iconic one being Conway's *Game of Life*. Existing only in a computer simulation and based entirely on the initial conditions, individual configurations may change, die out, evolve more or less complexity or even reproduce ^[11].

Richard Dawkins imagines alien life that we would not recognize as such, including biochemistry is based on silicon rather than carbon, or ammonia rather than water, or even life based on "electronic reverberating circuits ^[12]." There may be life whose instruction sets appear so widely distributed over time and space (physical or semantic space) that they are not even recognized by humans as, in any way, associated with each other ^[13].

A cybernetic concept of spirituality: optimizing both the instruction sets and the machinery to carry the instruction sets out.

Another implication is that life may exist in ways not before considered. Mathematician Stephen Wolfram declared, "It is possible to view every process in nature or elsewhere as a computation ^[14]. Whereas Animism, the concept that all things contain souls, has been held to be a shamanistic or ancient religious view, the similar idea that all things, to at least the level of simple systems, contain a mind, has gained popularity in some potentially rigorous philosophical and scientific circles, most notably in recent years through *The Integrated Information Theory of Consciousness* ^[15,16].

Such a definition starts to place mystical and scientific concepts in closer alignment than might otherwise be expected. Genetics and physiology correspond to an instruction set and the machinery to carry it out, respectively ubiquitous in the world of biological systems. In the domain of spirituality, when looking for instruction sets and the machinery to carry them out, it may help take the broader view of the language and the metaphors commonly employed by people engaged in spiritual practices. Terms like *The Word, logos, scripture, gnosis, received wisdom*, and references to being on a particular spiritual path all suggest that a given spiritual discipline carries information, an internal logic that often implies some form of boundary to determine inside from outside the system. Formal religions may be seen as one

type of vehicle to carry the information and contains people who carry out the system's instructions. Presumably, by carrying out the instructions, humans may be furthering the propagation of the genes they themselves carry, and the genes may reciprocally code for the tendency to seek out spiritual paths.

As an example of this interplay, consider the instruction set known as The Ten Commandments. It is contained in part of a very successful family of spiritual paths. It encodes a set of instructions that propagate the religion (admonitions to place no god before Jehovah, proscriptions against graven images, to keep the sabbath, detailing forbidden utterances in the name of the religion), guidelines to order the larger community, and even to maintain the genetics of the group as with the prohibition on killing which historically was not used to proscribe killing as an act of war or the killing of animals ^[17]. So, this very succinct instruction set, held firmly within a specific family of religious, spiritual paths, has sociological and even genetic/evolutionary implications for our species. Interestingly, these concrete implications of the Ten Commandments for maintaining a functioning culture and even survival as a species are as true whether the god of Moses actually authored them or whether or not that deity exists.

Pargament *et al.* note, "Virtually every major religious tradition speaks of life as a journey and provides its adherents with a map for the pathways they should take in life. We hear of the Eightfold Path in Buddhism. The Pillars of Islam describe the central pathway of living as submission to the will of Allah. Within Taoism, the word Tao literally means "the Way." However, it is important to note that although some people may follow the "preconstructed" pathways that have been made available to them through their traditions, others prefer to construct their own paths. Religious and spiritual pathways are constructed out of the raw materials of

cognition, affect, behavior, relationship, and biology ^[18].”

A person in the community finding their spiritual fulfillment lacking will often try to find some new or different spiritual path or try to find renewal in their longstanding spiritual tradition. Typically, they may set out to discover that path in some fashion, for instance, to go back to church, branch out to explore a very different religion, or perhaps take a sacramental entheogen with or without the aid of a guide. What exactly sets somebody off on a new spiritual path? Presumably, something about life as it is being lived is missing that should be present, or something present that ought not to be, or there be an unbalance somewhere when spiritual life is felt to be unfulfilling. This is another poorly defined situation that is encountered frequently, as evidenced by the sheer number of spiritual guides preaching their message to seekers with the desire to convert them into becoming a member of a group of devoted followers.

Sometimes, sudden spiritual changes happen abruptly, not just at the personal level but also so widespread as to represent a major change in an entire culture's spirituality or religion. One region of New York State became known as the Burned-Over District based on many new spiritual movements to emerge from there during the Second Great Awakening of the early nineteenth century. The name alluded to the region being metaphorically on fire with movements to include new religions in the Judeo-Christian tradition, such as the Shakers and the Mormons, and the wider diversity of the types of different practices, with the common theme being that they are considered spiritual. The region was the source of Spiritualism and the Oneida Society's first seances, a utopian experiment in radically alternative social structures ^[19].

After the intense period of new spiritual paths, over time, the area itself cooled considerably to spiritual practices in general,

even as some of the movements that incubated there did better elsewhere. That region, presumably for the very dynamics that made it such an intense incubator, later was inhospitable to spirituality for a time, the residents being beset with dubiousness towards such spiritual revivals. Charles Grandison Finney, a prominent leader in the Second Great Awakening, wrote of the Burned-Over District, "It was reported as having been a very extravagant excitement; and resulted in a reaction so extensive and profound, as to leave the impression on many minds that religion was a mere delusion. A great many men seemed to be settled in that conviction. Taking what they had seen as a specimen of a revival of religion, they felt justified in opposing anything looking toward the promoting of a revival ^[20].”

It is evident from this example that given the multiplicity of spiritual paths and the fact that they are not necessarily lasting phenomena among individuals or even cultures, a spiritual path is not necessarily some universal truth. However, some traditions hold themselves out as such. In fact, it is a common observation that what one individual will refer to as the one and universal truth is decried by another as a false religion, a face of evil, an abomination, heresy, or apostasy, in some cultures punishable by death. Even the same individual, over time, will renounce previous spiritual paths. It is almost as if there is an immune response, similar to perhaps the reaction to an incompatible tissue graft. Even the rejection of a previously held spiritual practice may serve some function in the larger ecology of human spirituality.

So, what description of spirituality can encompass the myriad of forms spirit can take while trying to find some way to rectify it with the need for study is a part of the science of medicine. Stripping down to as basic and universal a concept as possible may provide a map to the desired consilience, showing bridges that might not be evident

otherwise. **One definition for spirituality in this context conceptualizes it as a homeostatic mechanism for maintaining an optimal life. If life necessarily consists of instruction sets (code) and the mechanisms for carrying out the instructions, spirituality consists of routines necessary to optimize and maintain these codes of life and, by extension, the machinery to carry the codes out.** This includes any optimization routines that can affect genes (and other chemical pathways, perhaps as basic as an autocatalytic set), cultural information (memes), cognitive, emotional, unconscious, somatic, or autonomic routines, even structural or morphologically defined pathways. These are all codes or the machinery to carry the codes out. While some practices are widely understood to be spiritual, in this context, any practice that involves the maintenance of the codes of life is effectively spiritual to the degree it performs that function.

Such a definition of spirituality may appear overly broad, almost trivial, or tautological initially. However, it carries significant and often counterintuitive implications. This paper will pay particular attention to the more counterintuitive implications, exactly because they have been much less explored as topics, but the more common examples of spirituality can be seen to conform with this definition as well. Spirituality, in this context, exists because the organism exists in a complex and always changing ecosystem, so the demands on the organism change, needing a change in the code and or the machinery. In this fashion, spirituality could be viewed as an organ of Darwinian evolution. Because of the indistinct boundaries regarding what a spiritual practice is, who or what may engage in one, and at what aspect or hierarchical level of the life processes that spiritual processes are concerned with, this paradigm does not concern itself with determining those boundaries. The sole inclusion criterion is the existence of a code that must be

maintained and optimized somehow. From the perspective of the human ego, engaging in spiritual practice is familiar to it, but the same processes go on all around in the biosphere and beyond, in recognizable and still hidden ways. This is a much larger phenomenon than what humans engage in.

Exoteric religion, with its moral, behavioral, reproductive, dietary, and reflexive religion preserving commandments that have lasted over time (with clear examples, however of punctuated equilibrium), certainly qualifies as one of the more obvious approaches to optimizing the codes of life in a personal and societal sense. Others may seek more secret teachings through esoteric schools or try to find received wisdom directly, through a mystical state achieved through discipline or perhaps using an entheogenic substance. Nevertheless, the person who chops wood and carries water without wanting what they do not have may be described as spiritual, as can someone engaging in regular exercise or finding humor in a difficult situation. However, what then does not qualify as a spiritual path? What in life does not consist of optimizing the codes of life, and are there any attempts at optimizing the codes of life that would not be recognizable as a spiritual path of some sort?

Nearly all behaviors may have some impact on the optimization of how life is lived. But, beyond the guideposts provided through the teachings of family and culture, what one may do with their life is wide open, and some are undoubtedly more effective than others. There is little to define just what is meant by *optimization*. One must find or develop a suitable goal -- something being coded for that suggests optimization. Happiness, productivity, reproduction, wealth, physical health, generosity, and other possible goals limited only by the imagination are measures by which optimization can be judged. However, there would seem to be nothing to suggest that any one of them is exactly

necessary. Clearly, the code you start with at a point in time will suggest some optimization strategies over others, but the code can be changed to anything, to any degree, and the machinery of the organism will attempt to carry it out regardless of benefits or consequence. In the extreme, the boundary condition is death at a given point in time should a failure of optimization get too large, and that code no longer exists. So, even with few limits on what can be done spiritually, it would seem important to choose wisely. This is where tradition, also a code, may help by pointing out what has worked in the past. Throughout deep time, eventual extinction is the norm, but the evolution of the living has continued through constant trial and error.

One example of behavior that does not optimize code or the mechanisms to carry the code out is addiction. Addiction tends to degrade both the instruction set and the machinery and is notorious for being an example of behavior that is not spiritual ^[21]. Alcoholics and addicts behave differently when actively ill than they do pre-morbidly. The DSM 5 criteria describe the morbid behavior seen in substance use disorders. Among them and apart from the purely physiological changes includes, "A great deal of time is spent in activities necessary to obtain alcohol, use alcohol, or recover from its effects ^[22]." Somehow the codes being carried out are altered predictably by the excessive use of alcohol. Such effects of addiction may be described in terms of health, potentially from the biological health, psychological, interpersonal, and, in the case of an addiction epidemic, impacting the entire culture's health. Clearly, alcohol use disorder is an anti-spiritual practice, both as commonly understood and in the context of this schema.

Formal spiritual practices would aim to optimize the code and machinery for life in a given environment. In a self-referential step, the codification of such behaviors and their incorporation through learning and

developing a habit of them becomes, in itself, a spiritual practice. Some behaviors do not clearly affect either the code or the machinery, leading to complex results. Alcohol use disorder displaying the symptoms described above is clearly damaging to spiritual life, but moderate alcohol use can enhance it. While bicycling regularly may improve physical health, getting into a bicycle crash is likely to damage health. Bicycling may not be for everyone, depending on the judgment one tends to use while riding, but maybe a fine spiritual practice for some. There is at least some ambiguity like this in many situations.

That healthy spiritual practice may vary from one person to another is not an accident; it is a feature. Appropriate spiritual practices are context dependent. They are appropriate for the different needs people have based on their biology, family, community, physical environment, and other circumstances that would alter what changes need to be made to optimize their instruction set to adapt to the environment to maintain optimum spiritual and physical health. Further, a spiritual practice need not be intentional, conscious, or even recognized as happening by the individual, so long as it fulfills the criteria. It can be argued that the widening of the pupil of the eye to the darkening of a room in which one in has a spiritual dimension, in that it improves survival, but is relegated to the autonomic reactions under little control because, over deep time, it has needed little change.

Given the vast complexities of not only the code involved when all aspects of life are taken into account, but the environment the individual finds themselves in and given that the environment is expected to change over time, there is not a resolvable single best solution among spiritual practices, but there may be many good ones. By analogy, a traveling sales agent may need to book flights to seven cities, one after another. If they were to find the single most efficient route, they might spend thousands of years online with

the booking site figuring out the quickest and least expensive order to book them, or they may spend a few minutes on an itinerary that's good enough. Perhaps some extra effort may prove valuable, but at some point, the average person will decide that further effort provides diminishing returns. Given the complexities of life, spiritual practices to optimize routines are likewise in terms of effort made.

One aspect not covered yet is the particular value of the mystical state as a spiritual practice. The mystical state may mark direct access to certain codes of life, not easily accessible for modification otherwise. Winkelman hypothesized:

1. "The effects of psychedelics in producing visionary experiences involve the same mechanisms elicited by other non-drug mechanisms for altering consciousness and producing visionary experience; and"
2. "These mechanisms involve a disinhibition of regulatory mechanisms of the brain that releases a number of innate modules, operators or intelligences, especially the mirror neuron system (MNS) [23]."

There are observations that the mystical state may be integral to psychological health associated with the use of psilocybin [24]. Entheogens suppress the brain's Default Mode Network pathways while markedly increasing communication among regions of the brain that normally do not connect directly with one another [23]. Tasks in life are learned through repetition, and if repeated enough, are performed without conscious attention. Tasks learned so thoroughly are notoriously hard to unlearn, even when they are no longer helpful to the organism. Large volumes of object relations theory explain the emotional learning a child must undertake to become an effective adult in society. Issues with social learning at critical points in early life appear to lead to a significant number of

psychological disorders, requiring various esoteric methods to access those brain systems for reeducation [25]. Other emotional traumas sustained later in life are responsible for still more disorders, including adjustment disorders and Post Traumatic Stress Disorder [22].

Emotional problems may be conceptualized as instruction sets housed in the limbic and Default Mode Network pathways of the brain that are not optimized. The limbic system codes for tasks (such as skills in interpersonal distance modulation or social affiliation behaviors), typically learned to the point it is relegated to the unconscious for carrying out. In the case of psychiatric disorders, the machinery to carry out the code is unable to effectively do so, leading to psychic pain and or social dysfunction. In this context, at least some of the methods that reset that kind of learning appear to frequently be accompanied by the subjective sense of a mystical state, which may be induced with the use of an entheogen or through any number of spiritual practices.

One characteristic of psychedelic drugs is that they are well-known intoxicants, with acute degradation of fine detail cognition and some aspects of judgment. If only for that reason, it would be reasonable to assume that they are not particularly good agents, at least at large doses, to involve enhancements in the learning or relearning of fine details or procedures. These agents do bring emotional content to the forefront and appear to access mechanisms of social learning such as those mediated by mirror neurons [23], which is consistent with the kind of therapeutic effects observed when used to enhance psychotherapy. In this case, such treatment changes learned affectively charged behavioral routines. Once again, spirituality, this time in a mystical state, would serve to optimize the instruction sets of life and, by extension, the machinery of life.

Richard Dawkins' concept of memetics would also describe spirituality in this

evolutionary context, an outgrowth of the field of genetics in which the unit of information, rather than being the gene, is a unit concept or belief, passed from person to person culturally, called a *meme*. Memes follow the rules analogous in many ways to genes, including information replication, transmission, and mutation. Dawkins points out where memes with these characteristics are seen among non-human animals as well. He also makes the connection between religion and memetics explicit:

"Consider the idea of God. We do not know how it arose in the meme pool. Probably it originated many times by independent 'mutation.' In any case, it is very old indeed. How does it replicate itself? By the spoken and written word, aided by great music and great art. Why does it have such high survival value? Remember that 'survival value' here does not mean value for a gene in a gene pool, but value for a meme in a meme pool. The question really means: What is it about the idea of a god that gives it its stability and penetration in the cultural environment ^{[12]?}"

The inclusion of the concept of a deity or deities among the code-optimizing routines may not be entirely clear, but various possibilities are evident. It could be because a deity or deities actually exist in some capacity, from some self-organized meme that has its own optimization code for its environment and is merely linked to spiritual practices, much as two genetic markers are linked by being near each other on the same gene. Perhaps deities exist in some objective way outside of the meme pool, or the concept of deities are an emergent property of spiritual practices somehow. Perhaps the concept of a deity binds critical optimization code to the person using it.

Although a mystical state is one aspect of spirituality, the paradigm of spirituality as a mediator of adaptability to one's environment does not presuppose a mystical state or sense of unity or oneness with others. As a

mechanism of adaptability, one may envision spiritual practices that could be in direct opposition to the spiritual practices of someone else or even be practices forbidden in the code of society. The ritual use of entheogens has been and continues to be explicitly forbidden by society, but some spiritual practices may go further than that. While the spiritual path for perhaps most of humanity includes striving for community, love, and the unity of humankind, that is not the instruction set that everyone operates from. For instance, sociopaths have been present at least since the Epic of Gilgamesh, and the story of Cain and Abel were first told, and no doubt, well before that.

Sociopathy is one way of getting one's needs met and finding a degree of success, at least for a time. It is employed frequently enough if the size of the prison population is a measure, and those are the ones feckless enough to be caught, that it would appear sociopathy is a very common set of operating instructions. Obviously, that instruction set is very different than for others in the population. Traditional spiritual values, such as empathy toward others, are actually anathema to the sociopath. Deceit is practiced until the skill is honed, otherwise incarceration or worse awaits. That is the spiritual calling for a sociopath- to be very good at it. Other choices require far more effort to attain. In the terminology of mathematical dynamics, sociopathy is an attractor ^[26]. That the sociopath is on a spiritual path is certainly not a typical view of the range of spirituality. Nevertheless, it is seen in our religious mythology as Satan and demons and similar spirits, rejected but still eternally present in the spiritual realm.

Even far less universally reviled spiritual paths, including relatively common ones not so very different than one that has been embraced by a community at large, may be embraced by one individual but rejected by others in the community as incompatible and

treated as if it were an extreme and dangerous case. In some religious traditions, embracing a competing spiritual path may be punishable by death by the group as heresy or apostasy. This could serve to maintain the purity of the spiritual or ideological path and reject from the social group interlopers who would siphon off resources. In this sense, formal religion serves as a cultural flag, differentiating those inside from those outside a community. This is one form of code optimization and maintenance.

Conflict itself may be seen as spiritual and deeply woven into the fabric of not just human life but of all ecosystems. Billions of years of evolution on this planet and nature has never evolved out of a portion of the ecosystem being parasitic or predatory. As the Romans sacked its rival Carthage killing most of the population, enslaving the remainder, and making Carthage a Roman province, so too do similar dynamics happen throughout nature. Genetic rivals for a desired niche, even within the same species, may be destroyed, and behaviors among alpha-male predators over their rival and their rival's male offspring are observed. In the paradigm being described, this represents the dark spirit, but spirit, nonetheless. The field of game theory reveals the mathematics of these dynamics, showing that even if one were to reject the notion of taking advantage of one's neighbor in a diverse environment, one must be prepared for the possibility that another will embrace taking advantage of others, in small or large ways, to obtain resources ^[13]. Those who would personally travel a spiritual path that does not embrace blood sport need to be cognizant of this side of spirituality to avoid becoming a victim and avoid enantiodromia, the becoming of which one renounces. All living creatures have, in some form, defenses to protect them from assaults on their resources. In human society, there are many examples of warriors as a part of a spiritual path, such as the Shaolin monks and

the Knights Hospitaller. This is also why many spiritual paths include what Carl Jung referred to as *Shadow Integration* work to avoid unintentionally turning to the darker side of spirituality ^[27].

What forms might instruction sets take? They have been seen to come in more than one distinct form, including beliefs and concepts (memes) and actual genetics. As described here, there is no specific reason obvious to the author that where there is an instruction set and the machinery to carry it out, there is not also spirit. This would imply that a spirit could not just be found in other animal species but in systems not recognized as living. Cellular automata, genetic algorithms, and even artificial intelligent systems, at least in their working environment, would qualify as spiritual in this context unless a compelling argument could be found to the contrary.

IMPLICATIONS FOR RESEARCH

While there have always been ways to create data from aspects of spirituality, even if using behavioral proxies such as minutes a week spent in meditation or monies given to charity, measurement of mystical states can be accessed through questionnaires that use endorsing the common subjective elements of these states. Hill and Edwards identified approximately two hundred twenty-five distinct psychometric instruments for measuring religiousness and spirituality between 1984 and 2011. However, certain issues have posed recurrent issues in developing working universal psychometric instruments for these practices. One limitation is that most are culturally defined, typically towards subjects from a Judeo-Christian tradition, and the measures might not be valid for people of a different culture. Further, "the significance and meaning of research findings are undermined if the research itself, including the crucial element of measurement, lacks conceptual clarity. During what Gorsuch called the

measurement paradigm, the pull toward establishing a strong empirical framework often led to measures that, while psychometrically sound, were often without a clear theoretical grounding... Despite the initial promise as a guiding theoretical framework, the study of religious orientation soon became enmeshed in measurement issues to the point that it lost sight of its theoretical groundings [28]."

This paradigm assumes a wide variety of orientations to spirituality, expecting that different individuals and cultures will find different, sometimes vastly different approaches to resolving spiritual issues. Psychometrics may be developed that are not so dependent on cultural considerations when the issues being measured are more fundamental than the boundaries defining culture. Searching for a hypothetical objective, measurable unit of spirituality, the *numin* while an admirable goal, the paradigm outlined here would not be so complete or accurate as to be able to claim anything of the sort. It may, however, represent a philosophical step in that direction with some potential concrete benefits that the field has been lacking to some degree.

First, to the extent it represents a definition that both scientific researchers and practitioners in traditionally spiritual fields can agree on, it helps unify the theoretical underpinnings that can be used to bridge the two. This is likely more dependent on the relatively objective description of spirituality that rather widens the definition to encompass issues that may not be typically envisioned as spiritual, and which some spiritual thought leaders might not agree with.

From the scientific standpoint, using a framework of instruction sets that might not always be easily measurable could also pose a problem when designing a research protocol. Even so, some codes are quite scientifically described; genetic codes have been cracked, and it is a nominal cost to have one's

own genetics analyzed at this point. The social sciences have been grappling with issues of working with the code of early social learning-based instruction sets, limbic system-mediated psychiatric symptoms for some time, and theories have been developing from biological, psychological, and social perspectives that have been used to create treatments for some of the same issues for which certain spiritual paths have also provided relief. To date, however, describing the two approaches has been an apples-to-oranges comparison. To the degree this paradigm represents the truth for both fields, it may represent the beginnings of an apples-to-apples comparison and an aid to tools to measure the benefits of a spiritual experience with the tools of scientific research.

Beyond relying on subjective inventory-type questionnaires to create some form of objective data, one could envision improved objective, if nominal, data determined by the clinician, with a measure of the quality of the data being the degree of interrater reliability. One model for this already exists in psychotherapy research, that of research on Beck's Cognitive Therapy, in which an interview with the subject allows the clinician to determine the nature of the subject's core beliefs and automatic thoughts [29]. This is exactly about defining and updating psychological code of the sort that the mystical experiences provided by psychedelic-assisted psychotherapy also seem to reach. Once used to thinking about this new paradigm, it is unsurprising that engaging in psychotherapy qualifies as a spiritual practice.

For this paradigm to be of use in the real world, it would require that the arguments behind the main postulate stand up to criticism, or at least be a stepping-stone towards stronger arguments later. They should represent fundamental enough concepts that they do represent a theoretical consilience bridging spirituality and research, and in the end, they need to lead to some real

improvement in how research is conducted into spiritual matters. It is reasonable to postulate a completely different paradigm that leads to a similar or even better consilience. Work towards this does need to continue, and perhaps this is a step in the right direction.

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