

Neurofeedback and Ayahuasca: A More Effective Program for Personal Growth

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Abstract

Neurofeedback psychotherapy and the indigenous Amazonian Ayahuasca ceremony are described and contrasted in physiological and psychological terms. The analysis suggests that a combined approach would be more beneficial to participants than either of them separately. Such a combined program is described and it's argued that such a combination enhances the goals of each program by providing better preparation and post-training support.

1 - Impermanence

As a mountaineer I was addicted to the mental clarity I acquired from hard-won summits. I was also fascinated by the evaporation of my powers whenever I returned home, this being an amplified version of the back-sliding to normalcy that accompanies a vacationer's return to work. But mountaineering is a vision quest, and rather than reshouldering the mindset of employment I lost what felt like enlightenment.

The long-term value of any personal growth program depends on its permanent benefits. The program described here aims to make positive changes stick.

2 - Ayahuasca

This problem of holding on to one's insights comes up in the context of the Ayahuasca ceremony, a transformative experience centered around an hallucinogenic brew used by South American tribes since antiquity.^{1, 2} Ayahuasca is especially powerful among the hallucinogens due to its ability to open the gates of symbolic and emotional memory without disengaging or distorting your rational mind.

“Ayahuasca opens up people to their unconscious feelings and memories and gives them an opportunity to explore new psychological insights.”³

– Erik Hoffmann

During a ceremony your perceptions are distorted, to be sure, but you retain the power of intellect while reliving extreme memories and emotions, and in this way you can deconstruct negative patterns and manifest new positive patterns in their place.*

“By inhibiting, disrupting, or regulating emotional responses we may be able to change maladaptive emotional reactions.”⁴

– Elizabeth Phelps, Joseph LeDoux

My friends and I have noted the fleeting nature of our insights since we began exploring this ceremony in the middle 1990’s. Our insights often fade after we return to our normal, dissonant environments. On some occasions we be left feeling incomplete, unsettled, or distraught.

The more we discussed our experiences, the more we came to recognize that the Westernized version of the Ayahuasca ceremony lacks elements that are critical to its success in its indigenous context. First, because the shaman and the spirit journey has no precedent in our culture, the ceremony lacks the same relevance. Second, Western participants are generally poorly trained: a day or two of fasting and prayer barely prepares a person for a deeply symbolic, visionary experience.

This has led me, and my colleagues Muriel Turner[†] and Percy Garcia[‡], to expand the ceremony into a more comprehensive program that better prepares participants to have and to incorporate new insights into their lives. The program described here is designed to provide Westerners with a more effective program for personal growth.

* “Emotional memories are not simply erased. Oppressive negative memories need to be actively replaced by positive memories.” Dr. Isabelle Mansuy, University of Zurich cellular neurobiologist. Quoted in *Science Daily*, May 11, 2008.

[†] Muriel Turner, web page: www.seekingselfhappiness.com

[‡] Percy Garcia, web page: www.diosayahuascasana.multiply.com

3 - What Grows?

Personal growth implies understanding and change. Understanding leads to the improvement of what we already have, and by “change” I mean rearranging and adding to what we are. Consider the process these two paths play in the incorporation of new insights.

When we encounter a new idea we first try to understand it. Ideas that we can't understand will lose their relevance. Once deemed relevant an idea may turn into an insight. Yet even once an insight has been recognized we are likely to let it go if it conflicts with our deeply held beliefs.

With this in mind, our first proposal is to focus on gaining a better understanding of our insights, and to resolve the conflicts that ensue. It is not enough to recognize personal insights as significant ideas, to become useful they must become new patterns of thought and action.

Incorporating changes into our life requires reason and reflection. To achieve transformation we must reach beyond our epiphanies in order to expose and resolve obstacles to change, and this may cause physical distress and painful emotions like fear, rage, or despair. If these conflicts block our realignment, then we must address them.

4 - What Changes?

Meditation clears the mind; contemplation aligns emotion with intention; exercise reprograms the body. So much for refinement and realignment, but what about deeper transformations? In most cases “personal growth” refers to becoming better people, not different people.

This is a subtle point: unless we're deeply troubled we are attached to our sense of need, we remain attached in order to feel fulfilled. We struggle to find what we're attracted to — maybe it's love or happiness — and we do not aim to redefine what we're seeking.

The Sufi mystic Meher Baba's (1894-1969) simple admonition, “Don't worry, be happy!”⁵ is unsatisfying to most of us looking for happiness because it tells us to give up the search. We may consider giving up old habits and bad attitudes, but we rarely consider changing our basic constructs.

This is only sensible: isn't our moral quality and our intellectual potential linked to our values and sensitivities? Tinkering with how we perceive the world in order to be happier sounds

suspiciously like plastic surgery of the soul. What do our basic values and sensitivities consist of, anyway?

5 - Experience, Inclination, and Aptitude

Imagine our personality consisting of three parts:

Experience: Our experience is our history as stored in memory, it forms a basis for our interpretations and actions. Experience is what happens to us, and we try to shape our experience to suit our needs. The sum of our experience defines us, but we are not helpless.

The experience component of personality, or more precisely our *recalled* experience, refers to the emotional state triggered by stored memories. Memory of past events provides meaning for the present and the future. Beyond being the foundation of our thinking process, memory is the timber from which we build ideas.

Inclination: We have the freedom to interpret and to reinterpret our experiences. Though intellect, intuition, and free will we exercise control to preserve and enhance our situation. We've learned how to cope and generally prevail; with effort our skills improve.

Aptitude: We are born with, or are predisposed to develop certain skills. We take these things for granted: the quality of our memory, the coordination of our body, our sensitivity to sound and movement, our preference for structure or chaos.

Looked at in these terms our efforts at self-improvement focus on realigning our inclinations, and gaining a better understanding of our experiences. We focus on those areas where we have the greatest power to change. We endeavor to improve in those areas where we have aptitude, but we rarely attempt to develop new aptitudes.

It came as a great surprise to me — and few people have yet to appreciate it — that we can develop new aptitudes through the use of neurofeedback.

6 - Neurofeedback

"In my opinion, if any medication had demonstrated such a wide spectrum of efficacy (as neurofeedback therapy) it would be universally accepted and widely used." ... "It is a field to be taken seriously by all." ⁶

– H. Duffy, M.D., Professor and Pediatric Neurologist at The Harvard Medical School

Neurofeedback is a set of tools that allow you to sense otherwise hidden aspects of how your brain functions. It is useful to think of neurofeedback as a kind of hearing. A person learns to speak because they hear how their breath, larynx, and mouth make sounds. People who are completely deaf cannot master speech. In a similar fashion, neurofeedback facilitates the modification of aspects of your self that would otherwise be difficult or impossible.

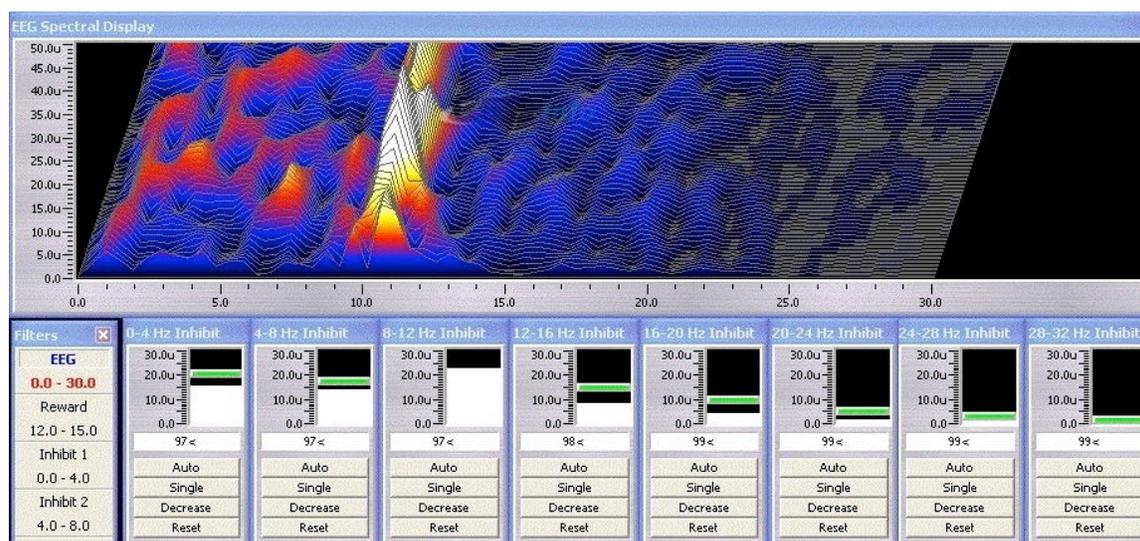


Figure 1. Real-time display showing the power, in micro volts, at different frequencies, in hertz, of a rapid series of measurement of the electric field at the scalp. Here the power is greatest in the Alpha band, ranging from 8 to 12 cycles per second. Taken from BioExplorer software, published by CyberEvolution, Inc.

There is a hitch: some aspects of yourself, which neurofeedback allows you to see, are hard to recognize because they are not the object of our senses, but rather our senses themselves. Are sounds brighter than they used to be? Am I having an easier time organizing my thoughts? It's often hard to tell.

New senses can be difficult to control. Consider developing perfect pronunciation in a foreign language, or overcoming a speech impediment. We think that we're aware and in control, but these familiar examples show things are not so simple. Feedback plays an essential role.

The prospect of learning new cognitive skills begs the question of what cognitive skills we have to begin with.

7 - Cognition

I laugh when I think of how little I know about myself. Certainly I'm busy talking to myself about myself, and about what's going on around me, but what are the elements of which I'm made? The elements of cognition are not what we recognize as our character, and that is because raw aptitude has no personality.

What mechanisms would we see if we opened up our heads and "looked under the hood?" It should come as no surprise that we are made from simple, basic things; things we all share but rarely study. We don't consciously look for these things, but we would immediately notice their absence. Among other things they include:

Certitude: the degree to which you recognize and hold a point of view, and your degree of comfort in dealing with unfamiliar things.

Coordination: you can bring a spoon to your mouth, but can you dance in pitch darkness?

Equanimity: both your inclination toward being calm or anxious, as well as your sensitivity to calming and anxiety producing influences.

Focus: how quickly and completely you attend to the events around you.

Locality: the sense of boundary that you maintain between yourself and others, your sense of position in space, your moral boundaries.

Organization: your inclination to order, rank, quantify, and manage. The way you organize events around you.

Prosody: our ability to imbue speech with meaningful tonality and to extract meaning from the tonal quality of speech. Prosody is the tonality of emotion.

Recall: the strength to which memories play a role in your thinking, and the degree to which you recall memories of various sorts.

Recognition: visual, verbal, spatial, and conceptual. Are you good at identifying what things are made of? How facile are you at seeing a new whole when ideas are put together?

Temperament: when do you switch between diligence and frustration? What is the purpose and limitation of each? Does your ability in modulating your temperament improve with knowledge or practice?

Tempo: the natural pace of events that you find most comfortable and at which you naturally find yourself engaged.

We equate many of these qualities with innate intelligence, and intelligence is seen as immutable. But intelligence is a slippery topic to which absolutes rarely apply. Neurofeedback techniques are facilitating changes in these areas, as I'll describe below.

In this description of cognition I am distinguishing between improving one's performance through practice — such as requires the exercise, exploration, and rearrangement of your natural abilities — and directly enhancing or “evolving” those abilities. The result may be the same, but the mechanisms are different.

For example, I may learn to be better organized through a long period of practice in which I learn to compensate for areas of weakness. This process typically takes weeks or months. Alternatively, I may learn to modulate the electrical patterns of my brain in order to become a more organized person. For people responsive to neurofeedback this is a process that takes 10 to 20 sessions each lasting 30 minutes or less. The frequency of sessions can range between twice daily to weekly.

The end result of these two approaches may appear similar, but different personalities emerge. In the first case, I remain a disorganized person who now uses new tools and habits to support a complex schedule in an otherwise disorganized life. In the second case, I have developed a natural attention to organization so that I am able to lead an organized existence without relying on tools or ritual. I become attentive to scheduling and develop a memory for details. If I become a naturally organized person, then it will be difficult to return to a disorganized life.

Do you want to retain your lifestyle and develop new management skills, or do you want to become an organized person to whom it comes naturally? Both have their attractions.

8 - How It Works

Neurofeedback is simple in practice: 3 to 6 small leads are attached to your scalp with a sticky paste. These leads connect you to a small amplifier that's connected to a computer. The computer

screen displays selected aspects of the electrical signals measured from these locations. As you change your mental state the computer screen immediately displays the result.

We can modulate the signals coming from our brains to a surprising degree, even though the signals are not obviously connected with, or responsive to any of our senses, faculties, or movements. Through various tricks of focus, relaxation, and imagination — or the lack thereof — we are able to change our brain waves, and the process is engaging. It's often said that the brain loves to look at itself.

We are pattern-oriented creatures, and new cognitive patterns make lasting impressions. Perhaps this is because neurofeedback leads us to new states of mind, rather than trying to break us of habits based upon memories. We're making changes at the source of our identity, where fewer habits stand in our way. Whatever the reason, the changes we make tend to “stick,” and they do so fairly easily.

9 - What We Are

Each of us is an energetic work of art, a system of spontaneity and mechanism in a dynamic balance that wanders around points of equilibrium. We are a tall and sensitive structure whose parts are at rest, under pressure, or in tension.

Physiologists and psychologists agree that one of the main functions of our mind is to filter out disruptive signals. We protect ourselves by being discriminating. Few people are aware of how damaging it could be to lose control of the filtering of our perceptions. Too much “noise”, as they say goes, and we can't hear ourselves think.

As we tinker with our “filters” in our endless efforts to improve ourselves, our actions are overseen by the many unconscious “guardians” that reside within us, and who prevent us from doing ourselves damage. And this brings us back to consider just how safe it is to be disturbing the fundamental regulatory processes in our brain.

10 - The Promise, the Risk

We watch the accelerating chaos in the world and we know changes are needed: changes in collective consciousness and changes in individual consciousness. Change is being forced on states and individuals confronting dire situations. Many feel, myself included, that we must be

proactive if we're going to survive and prosper as a race. If we accept this challenge, then we must accept the risks that come with attempts to change.

Unsuccessful attempts to change our situation can result in our collapse. We have only to look at the consequences of a few of the common aberrant behaviors: addiction, eating disorders, chronic anxiety, and violence. Each of these is or is related to an attempt at fomenting change. The question is how to recognize opportunities, assess their risks, and skillfully apply ourselves.

The program we are proposing is strenuous and it carries the prerequisites of good mental and physical health. Neurofeedback and psychotropics are being proposed to remediate a variety of disorders, but we are not proposing to "treat" people. We would screen against and exclude people in ill health.

The reward that comes from working on ourselves is some form of enlightenment, a new point of balance from which other solutions can be constructed. Ceremony, meditation, and therapy can alter our memory of the past and our reactions to the future. Neurofeedback tinkers with our basic aptitudes, the foundations on which our personalities rest.

11 - Safety

Is Ayahuasca safe? Adverse reactions are rare, but it is a strong hallucinogen, and one death was peripherally associated with its use in modern times.^{§7} On the other hand, I know people who drank as much of the brew as they could, and the physical result was not been much different from those who drank less. Anecdotal evidence suggests that a healthy person cannot dangerously overdose on Ayahuasca.

[§] The reporting of the death of an elderly woman in a ceremony led by Juan Uyunkar in 2001 mistakenly inferred Ayahuasca to have been the cause. My personal communication with two people closely involved in the case revealed that only a powerful tobacco-based decoction was used in the ceremony when the death occurred. There are no reports of deaths related to Ayahuasca, to my knowledge.

Can we find lasting benefit from psychotropics? After psychedelics exploded onto the scene in the 1960's there followed extraordinary claims, indulgence, and abuse. Shortly thereafter they became illegal and research into their potential ceased.

Times are finally changing. New research and quality scientific work concerning psychotropics is again being published.⁸ It is not surprising to those of us who have been working in this area that the results are positive.⁹

Ayahuasca is different from “designer pharmaceuticals” synthesized in the West, and which have been explored by trial and error. The Ayahuasca ceremony has been practiced for hundreds of years and has found a central place in many cultures. Like the Peyote used by the Native American Church, Ayahuasca has a recognized and legal role in certain contexts. While these cultures are different from our own, many feel that programs of this kind are essential for personal and social development in Western culture.¹⁰

12 - The Tools of Dr. Morbius

In the 1956 movie *Forbidden Planet*, Dr. Morbius and his daughter, the sole survivors on Altair-4, are menaced by a hideous monster that roams the planet. At the end of the movie we learn that the monster is Morbius's Id, an expression of his emotional dissonance powered by his mental super powers. He developed these powers using mind-enhancing technology that he unearthed on the planet, and which were originally developed by a now extinct super-race. Is neurofeedback this technology?

“Guilty! Guilty! My evil self is at that door, and I have no power to stop it!”

– Dr. Edward Morbius, in *Forbidden Planet*

So far, all indications are that Neurofeedback can be used safely. By its nature feedback provides the person experiencing it with the power to control its affect. However it does have its dangers, and this is partly because the experience of remodulating our internal systems can be so unfamiliar that the person experiencing it, the person who is ostensibly “in control,” will not know what they're doing.

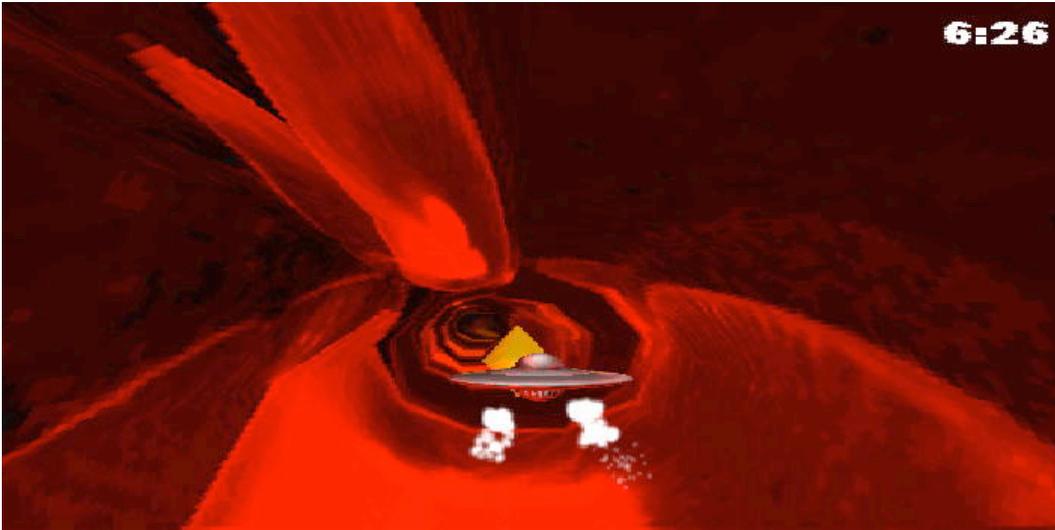


Figure II. When connected to a neurofeedback system you modulate your brain waves to affect the passage of the flying saucer as it moves through the tunnel. From “Inner Tube,” software produced by Somatic Visions, Inc.

The process is similar to learning to drive a car or fly a plane: we can see what we’re doing, but we don’t know what to do about it. For that reason the safe use of neurofeedback requires guidance and careful monitoring. In most cases a person soon becomes aware if they enter a disregulated state, but the loss of control can be injurious to people suffering certain disorders, such as migraines or epilepsy.

Some people who experience neurofeedback report no effect. Whether this is because they are inattentive, insensitive, inflexible, or have not been pushed sufficiently far, I do not know. But there are cases where protocols that have no effect on some people can have a large, potentially disturbing effect on others. For this reason the first test in every neurofeedback program is to assess a person’s sensitivity. This is done both by assessing their history, performing reactivity tests, and by evaluating their response to minor neurofeedback stimuli.

13 - Underlying Aptitudes

Neurofeedback provides a tool to improve mental regulation; what role does this play in the project of personal growth? In the three-part personality I described above, neurofeedback leaves the areas of inclination and experience untouched. In the context of the “tall and sensitive structure” that is our mind, changes to one part of are not stable until they are balanced by changes to those parts to which they are connected.

Our aptitudes underlie our inclinations and shape our experience. Our aptitudes may even govern our inclinations, such as a love of music that depends on discriminating hearing, or a love of poetry that depends on a facility with words. Our aptitude to recall memories is central to the emotions that underlie our habits. Change this balance and our personality can undergo a seismic rearrangement.

Herein lies a second great risk in the program of personal growth: if we succeed, then how will we react to our new world, and how will our world react to us? While many paths to positive change involve a struggle, each participant must decide which struggles are positive. The structure of any program for personal growth must enhance each individual's authority in orchestrating his or her own process.

We are proposing a benign program — a suite of three generally beneficial, well tested, and well tolerated neurofeedback protocols to better prepare people for personally transformative experiences. These exercises focus on stabilization. They avoid sensitizing emotional faculties that can be put under stress during the Ayahuasca ceremony. These three protocols were developed by Sue and Sigfried Othmer, and are detailed in materials published by the EEG Institute.¹¹

- 1 - Left and right temporal lobes: emotional stabilization, sustainable levels of attention.
- 2 - Left temporal and prefrontal lobes: mental calm, improved event sequencing, impulse control.
- 3 - Right temporal and parietal lobes: physical calm, perception of one's body in space.

14 - Precedent

Evidence that neurofeedback training will be helpful in the Ayahuasca ceremony comes from reports of the use of neurofeedback in other contexts. A neurofeedback protocol known as Alpha-Theta Training¹² is used to induce a sleep-like trance and has been shown to be beneficial in the treatment of addiction and traumatic disorders. In Alpha-Theta Training the participant is drawn into a hypnogogic or Theta state but, using neurofeedback, is discouraged from sleeping. While one element of the feedback keeps one awake, other elements inhibit tension, over-activity, and the state of "busy mind."

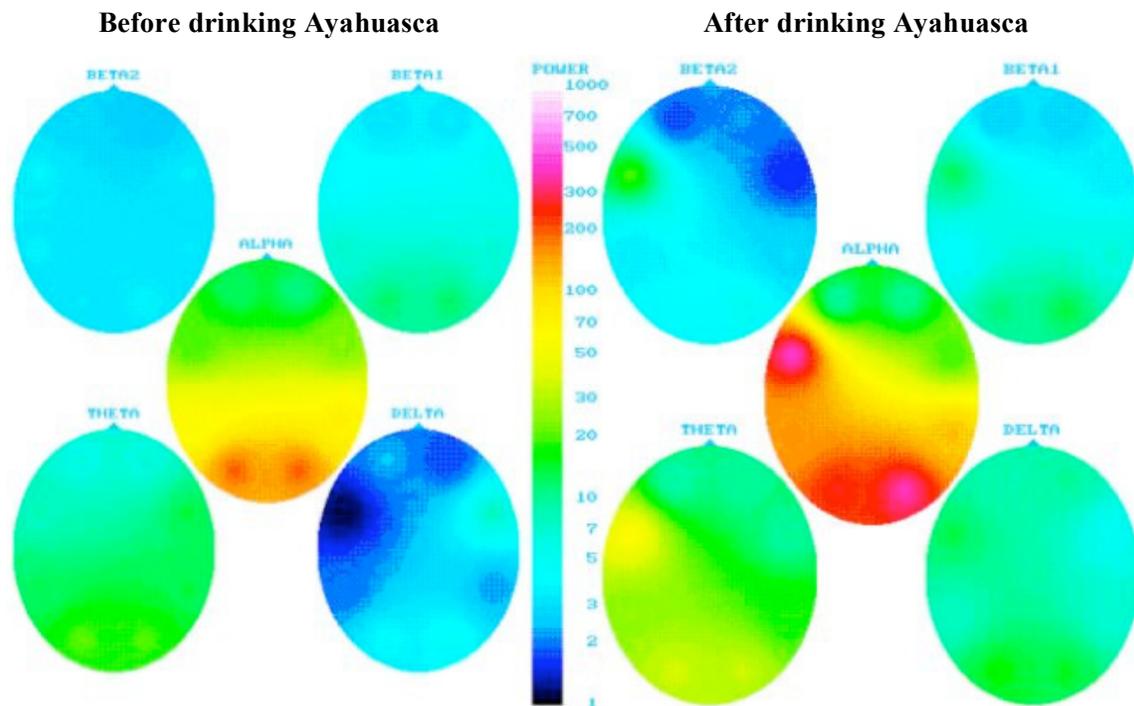


Figure III. Brain maps showing strongly increased alpha and theta activity following the intake of Ayahuasca. From Hoffmann, et. al. ³

People who have undergone Alpha-Theta Training report powerful emotional memories without the anxiety these memories usually engender. This is similar to what has been reported through the use of Ayahuasca. Alpha-Theta and Ayahuasca also show similar profiles in the brain's electrical and vascular states. ^{3, 13}

In their neurofeedback guidelines the Othmers suggest that Alpha-Theta Training be conducted “after achieving physiological flexibility and stability with the awake-state training.” While this has become the standard approach for neurofeedback, such awake-state training has not been used in conjunction with the Ayahuasca ceremony. Indeed, few people involved with Ayahuasca have even heard of neurofeedback.

15 - Being Reasonable

By inclination I mean one's conscious attitude, a combination of reason and preference: actions mediated by intellect. This part of our mind uses language to understand the world, and for this reason language is a primary tool for reconstructing our worldview. Meaningful use of language is central to our program, but we take a broad view and don't limit ourselves to being rational,

logical, or even verbal. For example dreams are often reasonable, but are rarely rational, logical, or verbal.

Sometimes people confuse reason with rationality, this is a mistake. Using reason only means you string thoughts together in an intelligible manner suitable for the exchange of ideas. Our society teaches limited reasoning skills whose full scope includes magic and other fantastical languages.

“Now, let go of gravity which is the last component which holds it all together and you will find that everything rises, raises and lifts and becomes stardust - tiny glittering existences of light. Call the stardust to you and into the carrier stone you are holding. Let it stream in until you feel it is fully charged, full up with stardust.”

— Part of the preparation of a magic potion To Protect The Innocence of a Child.¹⁴

In our program we incorporate reason through group interactions, dialog in pairs, and self-dialog in meditation. We do this using partner and group counseling, psychotherapy, ceremony, and dream work. This provides a spectrum of ways to encourage and support participants in their exploration of new insights.

16 - Our Bodies

Maintaining ourselves in Western culture rarely allows us to meet all of our needs. How did we let sleep, diet, physical tone, lack of stress and mental engagement come to be considered luxuries?

Our physical bodies are not ancillary to our spiritual selves. Our lymphatic system, muscles, skeletal, digestive, and cardio-pulmonary systems have major impacts on our cerebral function and total state of being. Not only is it difficult to further one's personal growth when one is sick, it's difficult when one is weak.

In our program we stress diet, exercise, community, relaxation and diversions as means to better prepare ourselves for transformation. These components work to support the processes triggered by the Ayahuasca and neurofeedback.

Diet includes organic meals, vitamins, and super food supplements, along with abstinence from stimulants, depressants, and other drugs.

Exercise includes morning pranic yoga, aerobic exercise, and mid-day hiking.

Community is built through group exercises, shared projects, and dream work.

Relaxation is supported by comfortable lodgings and the assurance of adequate sleep.

Diversions consist of indigenous ceremonies and easy tours to interesting locations.

17 - Putting It Back Together

Referring to our three-part picture of personality, our program proposes using neurofeedback to develop participants' basic self-awareness and energetic regulation, and in this way better prepare them for a transformative experience.

Several days later we will use the Ayahuasca ceremony to modify traumatic memories and habitual patterns. This ceremony uses lucid dreaming, visions, music, and magic. Careful intent, hallucinogenic plants, sacred objects, herbal baths, spiritual cleansing, and purging all contribute to a sense of wellbeing that supports the transformation process.

Along with, and subsequent to these events we'll provide individual and group support based on Western psychotherapeutic, Eastern meditative, and indigenous shamanic techniques in order to help clarify, process, and integrate the insights that emerge.

The program's objective is to create an experience that includes all of one's faculties, broadly supports one's needs, and provides the soil for new insights to permanently take root and flourish.

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