TRANSCULTURAL PERSPECTIVE ON CONSCIOUSNESS:

TRADITIONAL USE OF AYAHUASCA IN PSYCHOTHERAPY IN THE 21ST CENTURY IN WESTERN WORLD

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"…imagine if you could have the cathartic breakthroughs that ten years of hard therapy might give you in one afternoon."

– Jason Silva (2015)

ABSTRACT: New research on ayahuasca's potential applications in psychiatry have been undertaken in the last few years. It is relevant to start by pointing out that this south American brew has a very low potential for abuse, having no associated psychiatric or neuropsychological disorders. P.The most studied area in which ayahuasca may be applied is drug addiction. Interest for the understanding of ayahuasca's therapeutic potential in drug addiction is to determine by which mechanism the brew acts in order to promote behavioural and personality changes that allow freedom from addiction.

Some authors consider that the benefits provided by ayahuasca may arise from a symbiotic action between pharmacology and altered consciousness state, with some volunteers reporting an understanding of how some life happenings may have contributed to their depression and an achievement of a blissful state, which continued throughout time.

KEYWORDS: Drug addiction; Ayahuasca's potential applications; Antidepressant action; Anxiety

New research on ayahuasca's potential applications in psychiatry and psychoteraphy have been undertaken in the last few years. It is relevant to start by pointing out that this south American brew has a very low potential for abuse, having no associated psychiatric or neuropsychological disorders (Grob et al., 1996; Da Silveira et al., 2005; Gable, 2007; Halpern et al., 2008; Fábregas et al., 2010).

The most studied area in which ayahuasca may be applied is drug addiction. A Canadian study conducted by Thomas *et al.* assessed the impact of having ayahuasca ceremonies integrated in a rehabilitation programme in the form of a retreat (Gabor Maté's *Working with Addiction and Stress*). For that, 12 volunteers were selected and assessed by several psychometric instruments: *Difficulty in Emotion Regulation Scale* (DERS), *Philadelphia Mindfulness Scale* (PHLMS), *Empowerment Scale* (ES), *Hope Scale* (HS), the *McGill Quality of Life* questionnaire and the *4 Week Substance Use Scale* (4WSUS), which were given at baseline and repeated two and four weeks after the retreat, as well as monthly for five months (Thomas et al., 2013). Furthermore, the *State of Consciousness Questionnaire* (SOCQ) was given immediately after the retreat. The referred instruments were chosen because their analysis fits the bio-psycho-social model of human behaviour, trauma and drug addiction: though them it is possible to assess four factors which influence the drug abuse pattern (Emotion Regulation, Mindfulness, Empowerment and Hopefulness). Furthermore, while the *McGill Quality of Life* questionnaire is both a potential influencer of patterns of substance use and an outcome measure, the 4WSUS is the main outcome predictor, by assessing problematic substance use (Thomas et al., 2013).

Thomas *et al.* found out that the volunteers' score for the *McGill Quality of Life* questionnaire increased with statistical significance over time, and consistently after a slight decrease between the first and third follow-ups (figure 1). Both Hopefulness and Mindfulness criteria had a linear and statistically significant increase (figure 2) (Thomas et al., 2013).

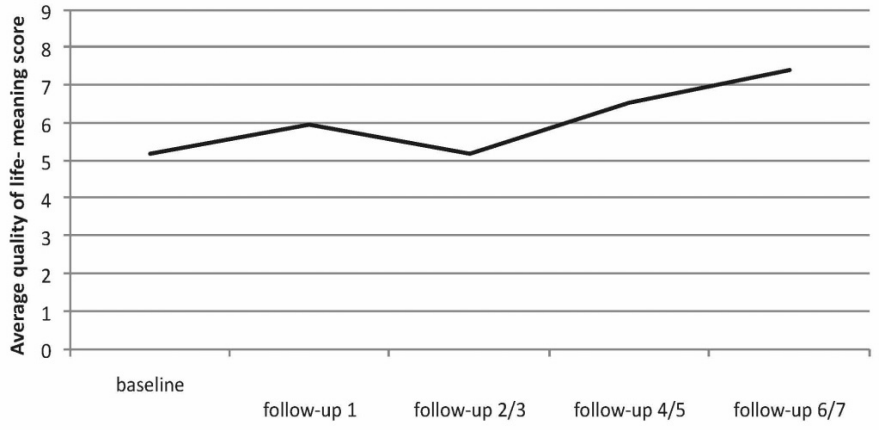

Fig. (**1**) **–** Average *McGill Quality of Life* scores through time (Thomas et al., 2013)

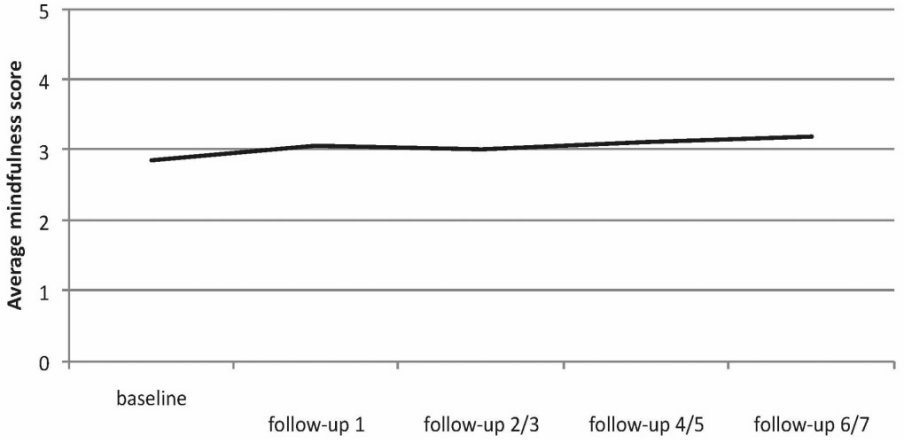

Fig. (**2**) **–** Average Mindfulness scores through time (Thomas et al., 2013)

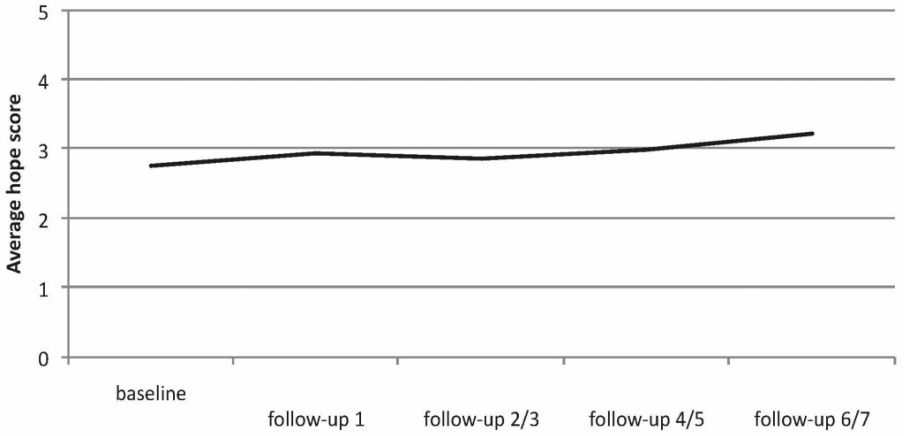

Fig. (**3**) **–** Average Hopefulness scores through time (Thomas et al., 2013)

Finally, it can be observed that the 4WSUS score decreased for all assessed drugs, having this decrease statistical significance for cocaine (figure 4). The only exceptions were *Cannabis*, sedatives and opiates, probably because these were medically prescribed to the subjects (Thomas et al., 2013).

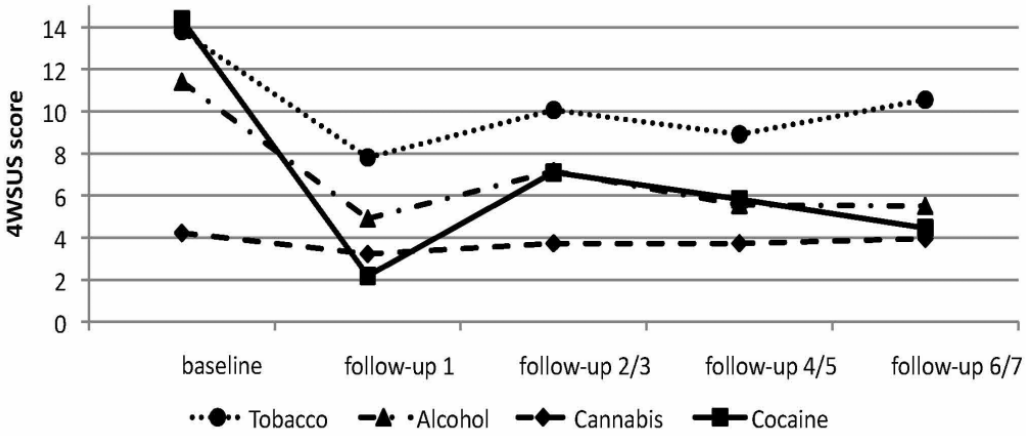

Fig. (4) – Average 4WSUS scores for tobacco, alcohol, *Cannabis* and cocaine (Thomas et al., 2013)

It can be concluded that this therapy model seems to be associated with statistically significant improvements in factors which hold an inverse relationship with drug addiction (Thomas et al., 2013).

Interest for the understanding of ayahuasca's therapeutic potential in drug addiction is to determine by which mechanism the brew acts in order to promote behavioural and personality changes that allow freedom from addiction.

One hypothesis lays on ayahuasca's pharmacology. Currently, the well-accepted hypothesis regarding neurochemical mechanisms of addiction suggests a dopaminergic hyperactivity in the mesolimbic pathway. This pathways is constituted by three critical brain areas, the ventral tegmental area (VTA), a neuronal group which releases dopamine when subjected to internal or external stimuli associated with addictive behaviour, the nucleus accumbens (NA), which receives dopaminergic signals from the VTA and the prefrontal cortex (PFC), directly connected to the VTA and indirectly connected to the amygdala. It is proposed that ayahuasca may reduce the dopamine levels in the mesolimbic pathway through its action upon the serotonin receptors (Liester and Prickett, 2012).

Firstly, while DMT is regarded to be a full agonist of $5HT_{2A}$ receptors, β-carbolines may also act as agonists of these receptors. It is also known that $5HT_{2A}$

stimulation reduces the dopaminergic levels in the mesolimbic, nigrostriatal and mesocortical pathways (Liester and Prickett, 2012), either because the agonism of postsynaptic $5HT_{2A}$ receptors in dopaminergic pathways has a direct inhibitory effect on the dopamine release, or because of the existence of connexions among dopaminergic and serotoninergic pathways established through GABAergic interneurons, which inhibit dopamine release (Liester and Prickett, 2012).

Secondly, it is known that dopamine is the primary inhibitor of prolactin synthesis. Since $5HT_{2A}$ agonism promotes prolactin synthesis (Liester and Prickett, 2012), it is fair to assume that this happens by dopamine inhibition. Regular ayahuasca users present high prolactin levels (McKenna, Callaway and Grob, 1998), which further supports this hypothesis.

Being so, it can be concluded that ayahuasca reduces dopaminergic activity in the mesolimbic pathway through the pharmacological actions of DMT and possibly β-carbolines.

Another therapeutic topic of interest resides on β-carbolines' action upon DATs, since these alkaloids inhibit DYRK1A, a kinase found in the striatum which act as an important modulator of dopaminergic transmission and in dopamine vesicles' endocytosis (Brierley and Davidson, 2012).

Considering that DYRK1A acts through the inhibition of DAT's membrane trafficking (Brierley and Davidson, 2012), β-carbolines may promote a balance between the intracellular and extracellular dopaminergic concentration by preventing the kinase's action. This happens since, with the inhibition of DYRK1A, a higher number of DAT will be available for dopamine reuptake, countering the kinetic turnover promoted by several drugs. This contributes to the decrease of excessive extracellular levels of this neurotransmitter and consequently to the compensatory increase of its maximum reuptake index.

Finally, some studies show that harmine and norhaman can reduce morphine withdrawal's biochemical effects upon tyrosine hydroxylase, reducing the symptoms of its abstinence syndrome, which can be generalized for all opiates withdrawal (Aricioglu-Kartal, Kayir and Uzbay, 2003; Miralles et al, 2005). Despite its explanation not being clear yet, it encompasses these β-carbolines' high affinity for imidazoline receptors, namely I_2, since another drug selective for these receptors, LSL, obtained a similar effect (Miralles et al, 2005).

However, the pharmacological mechanisms appear not to fully explain all of ayahuasca's potential. Another theory rises, based on the psychosomatic effects of this brew. In a extensive ayahuasca projects review, Loizaga-Velder obtained results which indicated that the involvement of certain individuals in ayahuasca's sessions would

lead to a lack or substantial reduction of drug use (Loizaga-Velder, 2013). It was possible to conclude that this brew can act as a catalyst for psychotherapeutic processes obtaining results in a shorter time, with greater efficacy and, at times, when other therapeutic strategies fail (Loizaga-Velder, 2013), given that there is an adequate set, setting and integration process (Loizaga-Velder and Verres, 2014). In order to explain the mechanisms by which this happens, three effect groups should be considered:

The first group includes ayahuasca's somatic effects. Emetic episodes, denominated *purges*, are commonly recounted after the brew's intake. Purges are reported to be powerful inductors of deep altered states of consciousness which together with the emetic episode itself, helps releasing psychological burdens, leading to a sensation of redemption, relieve, clarity and reduction of craving (Loizaga-Velder, 2013). A volunteer of a studies carried by Santos *et al.* declared having vomited large quantities of alcohol and cocaine (marães dos Santos and ano Holanda, 2006). More important than to understand whether this statement derives from a synesthetic process, a metaphorical hallucination or if the volunteer really felt the smell of alcohol and saw cocaine, is to realize the transformative potential that this experience had on the individual, who claims it was fundamental to solve her addiction problem (marães dos Santos and ano Holanda, 2006).

The second group relates to personal experience (Loizaga-Velder, 2013), being subdivided in psychobiographical and emotional effects. In the first subgroup, there are episodes in which traumatic live happenings are relived by the patient, however from a new, more integrated and functional perspective. It is possible, through these experiences to grasp how past choices and behaviours influence the present life situation (Liester and Prickett, 2012). Some volunteers reported that, through ayahuasca, they understood they were embarking upon a "selfdestructive lifestyle, which would inevitably lead to their ruin or even death, unless they operated a radical change on their personal conduct and orientation" (marães dos Santos and ano Holanda, 2006). Another type of ayahuasca's psychobiographical effect is the visualization of hypothetical future life situation which derive from their choices in the present (Liester and Prickett, 2012). It is also relevant to stress the facilitation of introspection, since ayahuasca's altered state of consciousness can lower the psychological defence mechanisms. Being directly confronted with their own behaviours and feelings in such personal way (since they derive directly from the self) instead of these being exposed through therapy (which often lead to denial), the patient is incapable of refuting their reality, embracing change (Loizaga-Velder, 2013).

In the emotional effects subgroup, it is important to highlight an increase in empathy, which improves communication and interpersonal relationships,

contributing to a positive emotional feedback, which counteracts the isolation characteristic of drug addiction (Loizaga-Velder, 2013). Furthermore, ayahuasca is capable of generating catharses and abreactions (marães dos Santos and ano Holanda, 2006) with reparatory effects on the emotional level (Mabit, 2007).

Finally, the third group of effects act upon a transpersonal level, providing the patient with a connexion with Nature, contact with the Divine or the sense of being part of a Universal Consciousness (Loizaga-Velder, 2013), a feeling resembling the Hindu and Buddhist metaphorical concept of Indra's Net of Jewels. Generally, these experiences are preceded by an episode of quasi-death or ego death. Transpersonal experiences' efficacy lays on their capacity to elicit insights about the patients' personality: during ayahuasca's altered state of consciousness, the living of symbolic although seemingly real death followed by a contact with the Divine with properties of a *mysterium tremendum et fascinans*, promotes a reflexion of personal values (marães dos Santos and ano Holanda, 2006). Loizaga-Velder and Verres found out that 9 of the 14 interviewed stated that, with ayahuasca sessions, their cravings disappeared, having two thirds of them attributed this to the reflexion induced by transpersonal experiences (Loizaga-Velder and Verres, 2014). After the interviews, patients reach conclusions, which enable a growing sense that life has a meaning, usually connected with spirituality (Loizaga-Velder and Verres, 2014). Drug abuse is seen as a tragic mistake caused by a misunderstood spiritual longing for Transcendence (Berges and Fábregas, 2013). It can be argued that Transcendence is but an alteration of basal consciousness state, which is an integral part of human life, attainable without the use of psychoactive substances (though dreams, extreme pain, meditation…) (Mabit, 2007). Bearing in mind that these consciousness alterations are indispensable and represent a need for spiritual fulfilment, populations should be educated on how to access these Transcendence states in a safe and beneficial way. It is worthy noticing that despite a close relationship with entheogens, indigenous populations only suffered from collective drug abuse problems after contacting with Western societies and being subjected to acculturation (Mabit, 2007). This may have happened because indigenous people can easily integrate altered states of consciousness in their social, psychic and social structure, in a coherent manner for the individual and his reference group (Mabit, 2007). Such does not happen in Western culture, which tends to be self-referring and lacking the spiritual and psychosocial tools. Therefore, the individual is "imprisioned" in a alluring state in which daily reality becomes insipid. Thus begins the process of dissociative dependence (Mabit, 2007).

Another set of conditions possibly treated with ayahuasca sessions are anxiety and panic disorders. The currently accepted first line treatment from such are SSRIs

(Bandelow et al., 2012, Baldwin et al., 2014). It is possible to be understood through the neuropharmacological action of these drugs that the disorders' symptoms are attenuated by a serotoninergic activation, promoted also by ayahuasca. In a study conducted by Santos *et al.*, 9 volunteers with more than 10 years of experience with ayahuasca sessions taken each two weeks were surveyed through the State-Trait Anxiety Inventory (STAI), Anxiety Sensitivity Index (ASI-R) and Beck Hopelessness Scale (BHS) (Santos et al., 2007), R. G . The three instruments were filled by all at the beginning of the experiment, after the volunteers drank a placebo resembling ayahuasca. The methodology was repeated for the following two weeks, with either placebo or ayahuasca given to participants before answering the questionnaires. The results show a statistically significant decrease in despair and panic, measured respectively by BHS and ASI-R, without, however, affecting anxiety traits (STAI) (figure 5) (Santos et al., 2007). Regarding this, it can be argued that volunteers began the study with low levels of anxiety, therefore ayahuasca's potential to reduce anxiety would not be detected (Santos et al., 2007).

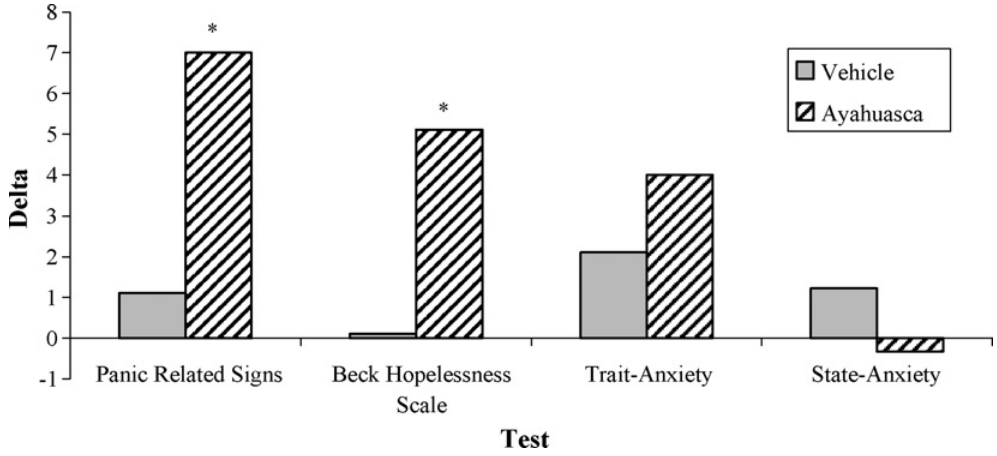

Fig. (5) – Mean of changing scores from baseline to experimental sessions across the four different test. A positive delta-value shows a reduction in score, while a negative value reflects its increase. Asterisk (*) indicates a statistically difference between vehicle and ayahuasca treatments with a significance level of $P<0.05$ (Santos et al., 2007)

The results can be caused by the pharmacological properties of both DMT and β-carbolines, namely their effect upon serotonin receptors and MAO-A, respectively (Santos et al., 2007).

Finally, there is an apparent benefit from ayahuasca's consumption for major depressive disorder. In a study conducted by Osório *et al.* on six volunteers with clinical diagnosis of treatment-refractory depression, several mood-related psychometric

parameters were assessed using the Brief Psychiatric Rating Scale (BPRS), Young Mania Rating Scale (YMRS), Hamilton Rating Scale for Depression (HAM-D) and Montgomery-Åsberg Depression Rating Scale (MADRS) before and several times after (from 40 minutes to 21 days) a single ayahuasca consumption (Osório et al., 2015). HAM-D and MADRS suffered a similar variation pattern, decreasing continuously until the fourteenth day and having a statistically significant score reduction at the last checkpoint (figure 6) (Osório et al., 2015). There was also reported a decrease in BPRS, manly the parameter which measures anxious depressive symptoms (BPRS-AD), supporting antidepressant and anxiolytic effects of ayahuasca (Osório et al., 2015).

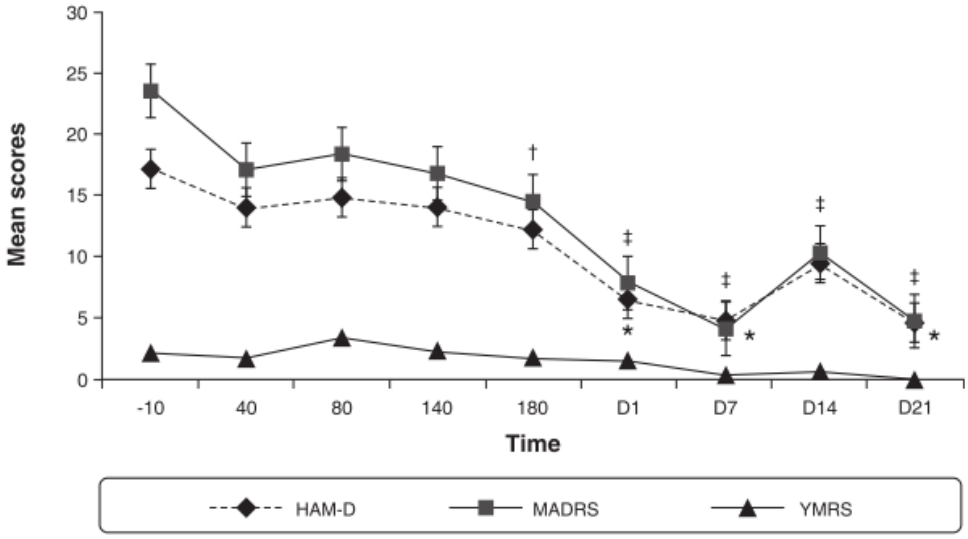

Fig. (6) – Temporal distribution of mean scores on the HAM-D, MADRS, and YMRS (Osório et al., 2015)

This acute antidepressant action, as well as the maintenance of results 21 days after a single dose intake is one of the most promising aspects of ayahuasca use in this context, since current medical therapy takes 2 to 4 weeks before reaching its peak effect and patients usually enter remission after 6 weeks (Liester and Prickett, 2012; Baldwin et al., 2014) (Osório et al., 2015). It is also worthy to highlight that ayahuasca had promising results in conditions which failed to respond to conventional treatment, being this demonstrated in other two studies (de Lima Osório, 2011; Sobiecki, 2013).

The mechanisms of action may again reside on ayahuasca's effect on the 5HT receptors (Ray, 2010) and on MAO-A inhibition by β-carbolines (Riba et al., 2003), which increase the availability of serotonin and other monoamines involved in the

etiology of depression. Furthermore, a study showed a decrease in BOLD signals in structures of the Default Mode Network (DMN), such as the anterior and posterior cingulate cortex, medial prefrontal cortex, precuneus and in the inferior parietal lobe after ayahuasca intake (Palhano-Fontes et al., 2014). A study by Sheline *et al.* reported a hyperactivation of DMN in major depressive disorder, probably because this condition is associated with a pathological inability for DMN to regulate self-referencial activity in an appropriate way (Sheline et al., 2009).

Some authors consider that the benefits provided by ayahuasca may arise from a symbiotic action between pharmacology and altered consciousness state, with some volunteers reporting an understanding of how some life happenings may have contributed to their depression and an achievement of a blissful state, which continued throughout time.

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