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Evidence of health and safety in American members of a religion who use a hallucinogenic sacrament

Authors' Contribution:
A Study Design
B Data Collection
C Statistical Analysis
D Data Interpretation
E Manuscript Preparation
F Literature Search
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Summary

Background: Ayahuasca is a South American hallucinogenic tea used as a sacrament by the Santo Daime Church, other religions, and traditional peoples. A recent U.S. Supreme Court decision indicates religious ayahuasca use is protected, but little is known about health consequences for Americans.

Material/Methods: 32 (out of 40) American members of one branch of the Santo Daime Church were interviewed providing demographic information, physical exam, drug use timeline, a variety of psychological measures, and data about childhood conduct disorder. Subjects were asked about extent of Church participation, what is liked least and most about ayahuasca, and what health benefits or harms they attribute to ayahuasca.

Results: Members usually attend services weekly (lifetime 269±314.7 ceremonies; range 20–1300). Physical exam and test scores revealed healthy subjects. Members claimed psychological and physical benefits from ayahuasca. 19 subjects met lifetime criteria for a psychiatric disorder, with 6 in partial remission, 13 in full remission, and 8 reporting induction of remission through Church participation. 24 subjects had drug or alcohol abuse or dependence histories with 22 in full remission, and all 5 with prior alcohol dependence describing Church participation as the turning point in their recovery.

Conclusions: Conclusions should not be extrapolated to hallucinogen abusers of the general public. For those who have religious need for ingesting ayahuasca, from a psychiatric and medical perspective, these pilot results substantiate some claims of benefit, especially if subjects interviewed fully reflect general membership. Further research is warranted with blinded raters, matched comparison groups, and other measures to overcome present study limitations.

key words: ayahuasca • hallucinogens • religious use • Santo Daime • assessment

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BACKGROUND

Traditionally the most important medicine and religious sacrament of Native peoples across South America is "ayahuasca" (also known as "hoasca" or "oasca", "Daime", "yajé" or "yage", "caapi" or "kahpí", "cipó", "natema" or "natem", "dapa", "mihi", and "vegetal") and evidence exists for its ritualistic use extending back into pre-history [1]. In the Quechua language, spoken by over 10 million people, "ayawaska" means "vine of the dead" or "of the ancestors" or "of souls". It is prepared as a "tea" by boiling an abundance of shredded *Banisteriopsis caapi* vine (containing reversible monoamine oxidase inhibitors (MAOI)) with the leaves of *Psychotria viridis* (containing N,N-5,5-dimethyltryptamine (DMT)) as well as sometimes an admixture of other plant products with nicotinic and muscarinic constituents [2–5]. DMT is not orally-active, but a sufficient amount, in combination with an MAOI, will be hallucinogenic for approximately 1–2 hours [6].

The United States lists DMT as a Schedule I hallucinogen in the Controlled Substances Act (CSA). Primarily in the later 1960s, illicit DMT typically was synthetic and smoked for a brief, very intense intoxication of 15 to 20 minutes. DMT has never been considered a major part of the illicit trafficking of drugs of abuse: the U.S. Drug Enforcement Administration's Office of Diversion Control [DEAODC] reports that it is only "sporadically" encountered in the illicit market [7]. DEAODC also reports that from 1996 to 2006 there were only 71 drug samples of DMT from 31 cases noted in the System to Retrieve Information from Drug Evidence (STRIDE), a federal database cataloging seized drug samples analyzed by DEA forensic laboratories, and that, from 1999 to 2006, there were only 65 state and local cases involving 82 DMT samples listed in the National Forensic Laboratory Information System (NFLIS) [7]. For comparison, consider that during just one year (2006) there were 21,783 samples of cocaine listed in STRIDE and 371,602 cocaine samples listed in NFLIS [8].

Over the past 20 years especially, some American, European, and other world travelers have trekked to the Amazon Basin to experience ayahuasca for its spiritual/deeply mystical properties [9–12]. Hallucinogens are also now called "entheogens" ("manifesting God within") by some who ingest these compounds with religious and/or spiritual intent [13]. Indeed, Native peoples, as mentioned, have for hundreds if not thousands of years found important religious significance through the sacramental ingestion of ayahuasca (South America), mescaline-containing *Echinopsis* (*Trichocereus*) cacti (Peru), mescaline-containing *Lophophora williamsii* (peyote) (North America), and ibogaine-containing *Tabernanthe iboga* (West Africa). In Brazil, several religions exist that combine elements of traditional Native belief with Christianity, and over the years these syncretic religions have grown to include members from many countries around the world. The largest Brazilian ayahuasca religions are the Santo Daime, the União do Vegetal (UDV), and the Barquinha [14], with the Santo Daime legal also in Spain and the Netherlands. American members also returned to the United States quietly continuing their religious practice until 1999 when agents of the Drug Enforcement Administration (DEA) confiscated sacramental ayahuasca imported by representatives of the UDV and Santo Daime.

In 2000, the UDV entered a federal lawsuit seeking protection from further religious persecution, return of the seized ayahuasca, and negotiation with the DEA for enacting legal measures for the continued importation and distribution of their sacrament for their church. A pre-trial ruling essentially granted this relief to the UDV based on religious freedom grounds and the requirement that the government must exercise the least restrictive means of control of religious expression as required by the Religious Freedom Restoration Act of 1993. The federal government's response was to repeatedly appeal this ruling until it was finally accepted by the U.S. Supreme Court, which unanimously (8-0) decided in favor of the UDV in 2006. It should be noted, as well, that the Oregon State Board of Pharmacy granted in 2000 a religious exemption from their State's controlled substance laws for the Santo Daime Church's sacramental use of Daime ("Daime" is the Santo Daime's term for ayahuasca which means "give me" in Portuguese), concluding that it was a "non-drug" use and therefore not subject to regulation by the State's drug enforcement agencies.

Research into the acute and long-term effects of religious use of ayahuasca is limited, but its basic clinical pharmacology is known [6,15]. Psychoactive effects usually start 20–30 minutes after oral ingestion, lasting for 1 to 2 hours, as noted above [16]. Visual pseudohallucinations, intensification of affectivity up to ecstatic experiences, significant alterations of time/space perceptions and of body image are commonly experienced [17]. Somatic effects include mild increases of heart rate (5–15 bpm) and blood pressure (approximately 10 mm Hg) as well as elevations of cortisol, growth hormone, and prolactin [18]. DMT produces its effects mainly by influencing two types of serotonin receptors, namely the 5-HT1_A and 5-HT2_A receptors [19]. DMT is quickly reabsorbed in plasma and the tissues of brain, liver, kidneys, lung, and intestines. The maximum plasma levels (after oral ingestion) are reached at approximately 110 minutes. DMT is metabolized mainly by de-amination and N-oxidation as catalyzed by the MAO-enzymes. It is eliminated renally in 3–4 hours.

Several small studies have reported on the relative safety of ayahuasca when ingested in controlled religious settings [18], the absence of harm to cognitive functioning [18,20], the relative health and avoidance of drugs of addiction in adolescent church members [21], and examples of sometimes profound physical and mental healing [22], including one double-blind study noting acute amelioration of anxiety and panic in ceremonies of the Santo Daime [23]. Study populations reported in these peer-reviewed publications are most commonly Brazilian as the largest number of members of these Brazilian ayahuasca religions remains in this country of origin. With the legal status of religious use in the United States still not fully clear and with ongoing government claims of public health and safety concerns, assessment of American members of these religions is of public health importance. Yet the government has never undertaken to conduct or fund any such study. The Santo Daime Church in Oregon (Church of the Holy Light of the Queen) contacted the investigators and requested that they undertake a study of the investigators' own design to assess short and long term health effects of the sacramental ingestion of the Daime tea. We conducted an initial study to complete semi-structured psychiatric interviews of their active members who wished to volunteer meeting with us. This

Table 1. Demographics.

# Male	15		
# Female	17		
Married	47%		
Mean ±Standard Deviation		(Range)	Median
Age	49.6±9.3	(32–67)	49.0
Years of education	16.4±2.4	(11–21)	16.0
Years Santo Daime member	6.5±4.4	(0.5–19)	6.75
Age @ 1st Ceremony	41.3±11.2	(13–63)	40.5
# Ceremonies	269±314.7	(20–1300)	177.0
Attendance/month	4.8±2.9	(0.2–8)	4.0

study was approved by the Colorado Multiple Institutional Review Board as part of a larger project evaluating cognitive competence and drug use in this population that was terminated due to the untimely death of the co-principal investigator (AJR).

Material and Methods

The entire current membership of the Santo Daime Church in Oregon (approximately 40 people) were informed about this study and encouraged by Church leadership to participate. In July, 2006, over the course of one week, 34 members of the Santo Daime Church were interviewed by a research psychiatrist (JHH) with the assistance of a post-doctoral fellow psychiatrist. After informed consent was secured, a subject interview lasted for approximately 2 hours. In addition to obtaining basic demographic data, we completed a careful timeline-based survey of lifetime drug use [24], the Structured Clinical Interview for DSM-IV Disorders (SCID) [25], the 14-item Hamilton Anxiety Rating Scale (HAM-A) [26], the 21-item Hamilton Depression Rating Scale (HAM-D) [27,28], the Symptom Check List 90 Revised (SCL90R) [29], the Uplifts, Hassles, Stresses, and Cognitive Failures questionnaire (UHSCF) [30], the Wender Utah Rating Scale (WURS) [31] for attention-deficit hyperactivity disorder, and we interviewed subjects regarding childhood conduct disorder using questions that closely resembled those used on the Structured Clinical Interview for DSM-IV Axis II Personality Disorders (SCID-II) [32]. A neurology-focused physical exam was also performed. Finally, we asked detailed questions about extent of participation in Church services, what subjects like least and most about ingestion of their sacrament, and what benefits or detriments to their health, if any, that they attribute to their sacrament. Demographic information on Church members who did not participate in the study was not collected.

Results

Demographics

Of the 34 Santo Daime Church members interviewed, two were relatively new members reporting little participation in Church services as of yet (5 ceremonies and the other only one ceremony), and, as such, were excluded, leaving data on 32 subjects for analysis. Demographic information reveals a mature membership (Table 1) who usually joined in their early 40's and attend at least one Church prayer service a week. Almost half the subjects were married, all were gainfully employed except for one person currently unemployed, and two were retired. Most subjects have a college degree. The physical examination revealed physically healthy individuals.

Table 2. Claimed benefits from church participation/use of ayahuasca*.

Benefits	# of Subjects (out of N=32)
Improved general physical health	12
Increased mental clarity	11
Improved relationships	9
Improved outlook on life	7
Increased sense of purpose in life	6
More spiritual in life	6
Happier/sense of wellbeing	5
More self-confidence	5
Calmer	5
More compassion/empathy	4
Increased energy	4
Smarter/improved concentration	3
Improved anger control/less angry	3
Feel centered	3
More humble	2
Quicker healing time	2

* Subjects were asked in an open-ended, non-structured fashion to "Describe what you like most about the Daime [ayahuasca]" and "What benefits, if any, have you found from participation in Church ceremonies?".

Perception/evaluation of ayahuasca and Church attendance

All subjects reported at some point in their interview that Church participation improved introspection and most often referred to their sacrament as a "good teacher" or "guide". Inquiring about specific perceived benefits, the most frequent replies are listed in Table 2 with additional information about improved mental health discussed elsewhere further below. Improvements of character, including confidence to be "more direct", were described by those subjects finding healthier, more satisfying interpersonal relationships since joining the Church. Two subjects offered detailed descriptions of how prayer and introspection in ceremony helped avert divorce. Some subjects attribute improvements to their chronic medical conditions because of sacramental ayahuasca, including reduction or cessation of migraine (N=3), overweight individuals losing 20 or more pounds (N=4), resolution of asthma (N=1), abatement of

Table 3. Claimed side-effects from ayahuasca*.

Side-Effects	# of Subjects (out of N=32)
Nausea	11
Vomiting	9
Exhaustion for 1–2 days afterwards	9
No side-effects experienced	8
Insomnia only on the following night afterwards	4
Decreased memory for 1 day afterwards	2
Muscle spasm/stiffness	2
Visual changes	2
Headache	1
Hypoglycemia	1
Dry mouth	1
Tachycardia	1

* Subjects were asked in an open-ended, non-structured fashion "What side-effects, if any, have you experienced from ingestion of Daime [ayahuasca]?".

seizure disorder (N=1), and 1 individual with chronic fatigue syndrome went from typically being bedridden to obtaining retraining and returning to work part-time as a Registered Nurse after 5 years of full disability.

All responses from our questions about side-effects from ingestion of ayahuasca and what is least liked about practicing their faith are listed in Tables 3 and 4, respectively. Nausea and vomiting typify ayahuasca ingestion, so it is unsurprising that complaints of nausea, vomiting, and bad taste were frequently noted. No one described benefits being outweighed by complaints/problems. Of "What is liked least?", the most frequent response was that the ceremony was "arduous/too demanding", which refers to the rigors of actively participating in multi-hour all-night prayer vigils.

Psychiatric symptoms and drug abuse histories

Psychological measures suggest the members evaluated are mentally healthy (Table 5). No scores on the HAM-A indicate current clinical levels of anxiety and the same is true for the depression scores on the HAM-D except for one individual scoring a 19. That individual on SCID was diagnosed with bipolar I disorder, partial remission, and is currently on mood stabilizing medications without any report of disregulation of mood stability from Church participation or of drug-drug complications. Indeed, this individual reports making "better and less impulsive decisions" and no psychiatric hospitalizations since joining the Church six years ago. Data from the WURS did not identify any individuals with presumed childhood ADHD, and the Conduct Disorder checklist similarly did not reveal any individuals with childhood disorders of conduct. The UHSCF questionnaire results also indicate well-adjusted lives: uplifts scored near the maximum possible

Table 4. What is liked least about Church participation/use of ayahuasca*.

Liked Least	# of Subjects (out of N = 32)
Feel ceremony is arduous/too demanding	12
Taste of ayahuasca	11
Exhaustion for 1–2 days afterwards	8
Nausea/vomiting	5
Nothing is unliked	4
Concern about legality	3
Church "politics"	2

*Subjects were asked in an open-ended, non-structured fashion to "Describe what you like least about the Daime [ayahuasca] and/or from participation in Church ceremonies".

score of 15 and mean scores for hassles, stresses, and cognitive failures were low. Normative values for the UHSCF have not been established, but these scores appear similar to or superior to UHSCF scores reported for controls in a separate study comparing ecstasy (MDMA) users with non-users [33] and in the initial UHSCF study of tobacco smokers, non-smokers, and abstaining smokers [33].

For the nine symptom dimensions of the SCL90R, single sample t-tests were used to evaluate whether participants experienced rates of symptomatology comparable to those experienced by the general population (Table 5). With the exception of two dimensions, all scores were significantly lower than the population normative values, indicating that participants in the current sample exhibited lower rates of symptomatology than the general population. On both the Interpersonal Sensitivity dimension (t_{31}=–1.242, p=0.224) and Obsessive Compulsive dimension (t_{31}=–2.02, p=0.052), scores did not differ significantly from those in the general population. The SCL90R also includes three measures indicating overall symptomatology across the nine dimensions. The Positive Symptom Total (PST) reveals the overall number of symptoms endorsed. Scores on this measure were significantly lower than the population normative average (t_{31}=–3.641, p=0.0005), indicating that participants have fewer overall complaints than the general population. The Positive Symptom Distress Index (PSDI) is reflective of the intensity with which symptoms are experienced. Scores on this measure were significantly lower than the population normative average (t_{31}=–3.159, p=0.0018), indicating that participants report experiencing complaints with less intensity than the general population. Finally, the Global Severity Index (GSI) is the most sensitive single indicator of psychological status on the SCL90R. Scores on this index were significantly lower than the population normative average (t_{31}=–4.277, p<0.0001), indicating that participants report lower levels of overall severity than the general population.

The SCID revealed 19 individuals reporting past or present disturbances of mental health (some have more than one diagnosis). One individual still meets current criteria for a panic disorder and another meets criteria for

Table 5. Psychological measures.

Tests administered		Mean ± SD	(Range)	Median		
HAM-A		3.0±3.6	(0–15)	2.0		
HAM-D		2.8±3.7	(0–19)	2.0		
Conduct D/O*		1.1±1.5	(0–6)	1.0	t–value *df*=31	p value#
SCL90R**	Somatization scaled score	45.8±7.5	(35–59)	46.0	–3.168	0.0017
	Obsessive-compulsive standardized score	47.5±7.0	(37–62)	50.0	–2.020	0.0260
	Interpersonal sensitivity standardized score	48.2±8.2	(39–69)	49.0	–1.242	0.1118
	Depression standardized score	45.3±9.8	(34–71)	45.0	–2.713	0.0054
	Anxiety standardized score	44.2±6.0	(37–57)	42.5	–5.46 8	<0.0001
	Hostility standardized score	46.2±6.9	(39–59)	41.0	–3.115	0.0020
	Phobic standardized scaled score	47.0±5.2	(38–61)	47.0	–3.264	0.0013
	Paranoid ideation standardized score	45.7±7.0	(41–65)	41.0	–3.475	0.0008
	Psychoticism standardized score	45.5±5.4	(30–60)	44.0	–4.714	<0.0001
	Global Severity Index (GSI) standardized score	43.8±8.2	(30–61)	44.5	–4.277	<0.0001
	Positive Symptom Total (PST) standardized score	44.4±8.7	(24–61)	44.5	–3.641	0.0005
	Positive Symptom Distress Index (PSDI) standardized score	45.7±7.7	(30–62)	46.25	–3.159	0.0018
UHSCF	Uplifts	13±1.8	(10–15)	13.0		
	Hassles	4.9±3.1	(0–13)	5.0		
	Stresses	5.6±3.5	(1–13)	5.0		
	Cognitive failures	3.5±3.6	(0–13)	2.5		
WURS***		15.9±12.0	(1–40)	10.5		

* 12 questions were asked about behaviors prior to the age of 18 consistent with conduct disorder with 0 = to no problems of conduct and 12 = to problems of conduct on each question asked.

** Following instructions from the SCL90R manual (Derogatis 1994), raw scores were converted to standard (normalized) area T scores using provided normative data for male and female nonpatients and psychiatric outpatients. The T score is characterized by a distribution with a mean of 50 and a standard deviation of 10, with scores lower than 50 therefore signifying less symptomatology than the population average and scores greater than 50 signifying more.

*** A score greater than 46 is consistent with childhood ADHD.

Two-tailed T-test, evaluating observed sample mean against population normative average of 50.

bipolar I disorder (as mentioned), but both individuals describe seeing outpatient psychiatrists, feel that their participation in Church ceremonies has helped improve their mental health, and cannot identify any harms to management of their ongoing psychiatric issues. Five met criteria for a single prior major depressive episode that pre-dated their Santo Daime membership. Six met criteria for recurrent major depressive disorders with four in remission and two in partial remission. Four met criteria for simple phobia with two in remission and two in partial remission. Three detailed histories of bulimia nervosa in remission. Six met criteria for posttraumatic stress disorder or panic disorder, and all were in full remission. Eight individuals report induction of remission of their psychiatric condition through Church participation.

Drug and alcohol histories were quite varied as evaluated from the SCID and the even more detailed timeline-based history of use. Eight individuals report minimal to no exposures to drugs and very few intoxications from alcohol ever in their life. The other 24 individuals report histories of trying many different drugs of abuse but not a single individual described activation or re-activation of pathological drug use or worsening of use since joining the Santo Daime. Drug/alcohol diagnoses across lifetime for these 24 individuals are as follows (all are in full sustained remission, except for one individual reporting marijuana dependence in partial remission and one individual reporting ongoing marijuana abuse): 8 met criteria for alcohol abuse, 5 for alcohol dependence, 4 for marijuana abuse, 3 for marijuana dependence, 3 for hallucinogen abuse, 1 for sedative-hypnotic dependence, 1 for cocaine abuse, and 1 for stimulant abuse. The subjects with histories of hallucinogen abuse had all ended such problematic use years prior to joining the Church. The one subject meeting criteria for marijuana dependence in partial remission also claimed improve-

ment since joining the Church. All 5 subjects who met criteria for past alcohol dependence and also one subject with a history of alcohol abuse describe Church participation as the key turning point in their recovery.

Discussion

This is the first study to evaluate the health status of American members of the almost 80-year-old Santo Daime faith that originated in Brazil. Like many other religious Americans, devout members attend prayer services about once a week, but, unlike most other religions, those of the Santo Daime do ingest a hallucinogenic sacrament. Subjects reported improved health and relationships resulting from Church membership. They reported improved mental clarity and sense of life purpose, while also reporting nausea, vomiting, and a day or two of feeling tired after ingesting ayahuasca. Ten of the 32 subjects described physical health improvements since joining the Church. Nineteen subjects were diagnosed with psychiatric disorders in their lifetime, but all subjects were in good mental health, with only two members reporting an active psychiatric disorder.

From a psychiatric and medical perspective, the results substantiate some of the claims of benefit already reported in the literature (as noted above) and well known by the Santo Daime Church. Taken together, it appears that Santo Daime Church members are mentally healthy and experience benefits from their participation. The low scores for anxiety on the HAM-A and SCL90R suggest that the acute reductions in anxiety during Santo Daime prayer ceremonies noted by Santos and colleagues [23] may in fact be longer lasting. Despite 24 of the 32 subjects having in their lifetime periods of drug and alcohol abuse and dependence, 91.6% (22 of 24) of these problems are by history only, and none had any reactivation of problematic use since joining the Church. That all 5 subjects with past alcohol dependence and 1 for alcohol abuse describe achieving recovery and abstinence through the Church suggests that participation in the Diame ceremonies may well be worth studying in greater depth as an important treatment modality for alcoholism. Other investigators have already reported sustained abstinence from alcohol in former alcoholics who became members of the UDV [18,34]. There are also other surveys that have presented evidence of improved physical and mental health [35] as well as general safety of religious use [36–38]. There simply is no evidence from within the data collected to assert that there are concerning harms from the full practice of Santo Daime. Most side-effects, as detailed, from ayahuasca were temporal to ingestion, manageable, and rarely persisted beyond a day or two. If ingestion of ayahuasca is sometimes transiently stressful or emotionally problematic for Church members, it is striking that none of those interviewed described this in our questions about "what is liked least?," as listed in Table 4. It is also possible that the structured nature of the prayer services and follow-up meetings provide a reliable path for positive integration and utility after the acute effects of sacramental ayahuasca end.

The federal government has never demanded that Native Americans prove the safety of peyote in the prayer services of the Native American Church (NAC), yet in the current climate of federal resistance to accepting religious protections for the members of Santo Daime and UDV, this is exactly what is being demanded by the government of these non-Native groups. The ayahuasca in a typical serving does contain enough DMT and MAOI to induce a hallucinogenic experience, but in this religious context, as with the NAC and peyote, the ingestion of this ayahuasca appears to meet the same legal standard of a "non-drug, sacramental use". The intent is to commune with God rather than directly seeking a "drug high". As detailed by our subjects (Tables 3 and 4), the demands of the Santo Daime faith are arduous, as many prayer ceremonies continue through the night and the brewed sacrament itself can acutely induce nausea and vomiting after ingestion. Religious individuals of other faiths will recognize much in common with the Santo Daime in their sincerity of expressions of faith and self-improvement through prayer and fellowship.

There are several important limitations to this study. Though all members of this American community were invited to participate, 80% did so. It is possible that the other 20% of members might present quite differently than those interviewed, and, of course, no members of other Santo Daime communities residing in the United States or elsewhere were interviewed, and so our findings for these reasons as well might still not reflect general membership.

Of 32 established members interviewed, almost 60% had psychiatric histories. It is possible, then, that these participants were more familiar with speaking with psychiatrists and therefore more willing to be interviewed than the 6 members who did not volunteer. Yet we would expect our results to be skewed towards more unhealthy evaluations within our sample by being populated by more people with mental health histories. Instead, our results still revealed mentally healthy individuals, and as such, suggest participation in the Santo Daime Church is not proving harmful even to those members most susceptible to mental health problems. It is also possible that a type of self-selection bias occurred that precluded interviews with those who experienced harm: members who derived the most benefit remained in the Church and may have readily volunteered whereas those who have not benefited avoided participation. This Santo Daime community has approximately 110 former members. Former members of many religions describe their opposition to certain religious practices and duties, and this may be quite useful to evaluate in future studies of the Santo Daime, but the attitudes and wellbeing of active members should not be ignored because former Church members were not similarly evaluated. Almost all of the active members did volunteer, and these participants also asserted that their stories of healing and wellbeing and personal growth are common among members of Santo Daime.

Other study limitations include lack of comparison group and not administering measures blinded. We were however doing psychiatric assessments: our comparators are based on training, prior clinical experience, and use of the SCID, which is a reliable semi-structured interview for psychiatric diagnosis. The other test measures were either self-rated forms for the participants to complete or have clear protocols for physician administration. We also did not interview members before and after joining the Santo Daime, which would offer prospective data on claims of change. With available funds, we believe it could prove valuable to track individuals who are about to participate in the Santo Daime Church and then

continue to follow for several years those who remain members and those who don't. Future research could address some of these issues by use of a matched comparison group of non-members who are similarly religious and by use of raters blinded to group assignment. Expansion of assessment also may capture problems not yet identified; a careful battery of neuropsychological testing, for example, may reveal impaired performance on some measures. However, evidence already exists that long-term use of ritual-based hallucinogens does not lead to decreases in neurocognition [39].

CONCLUSIONS

If the Santo Daime continues to look favorably upon research of their membership, such data may prove helpful not just to a skeptical federal government but to key decision makers and stakeholders at the community level as well as to those specifically who wish to pray with the Santo Daime and/or explore how belonging to this faith may directly benefit them or not. DMT, the hallucinogenic substance found in ayahuasca, is, as mentioned, listed as a Schedule I drug in the CSA. Placement into Schedule I was not based on any specific negative research finding about DMT but, rather, was based on concerns for harmful consequences for Americans to ingest powerful mind-altering drugs of no known safety or utility. Yet America does have a long and positive experience of finding room for Native Americans who express their faith through the Peyote Way (and indeed the NAC is the largest Native religion in the U.S. with some 300,000 members). Much like with the NAC, the Santo Daime prayer ceremonies do provide membership a structured setting of known safety with the clear utility of religious meaning. Perhaps it will be through these types of religions that we will learn more clearly about pharmacologic benefits from these drugs where the safe environment resides in the church rather than the lab.

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Conflict of interest

Dr. Halpern reports having received fees from CHLQ for advising them on health related issues and will continue to provide such advice. Drs. Halpern, Ruttenber, and Sherwood have received some research funding from CHLQ for this study. Dr. Passie and Ms. Blackwell report no conflicts of interest.

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