

Neurophysiological Effects of Traditionally-Prepared Kava Measured by EEG: A Pilot Case Study

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Abstract

Introduction. Kava (*Piper methysticum*) is a culturally significant Pacific keystone species traditionally consumed as a water-based beverage. Global demand has led to commodification and misrepresentation, with kava often diverging from traditional forms. Evidence on the physiological and therapeutic effects of traditionally prepared beverage kava remains limited, while conflation with nonkava products risks obscuring cultural meaning and safety. This study addresses these gaps. **Methods.** A pilot electroencephalography (EEG) study investigated neurophysiological effects of traditionally prepared kava in culturally authentic settings. Two experienced adult male users were observed over a 6-hr session. Resting-state EEG was recorded pre- and postconsumption with the EMOTIV Insight 5-channel EEG headset. **Results.** EEG findings showed divergent responses. One participant displayed increased alpha and theta activity consistent with relaxation, while the other showed elevated gamma power linked to cognitive focus. These differences may reflect individual habituation or cultural use. Results highlight the need for larger studies connecting EEG data with behavioral measures to explore the ethnopsychopharmacology of traditional kava. **Conclusion.** This pilot study provides preliminary evidence that traditionally prepared kava produces measurable neurophysiological effects aligned with its cultural role as a calming, relational substance. The study underscores the value of culturally grounded, rigorous research on kava.

Keywords: kava; naturalistic setting; EEG; brain activity; ethnopsychopharmacology

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Introduction

Kava is often explained as the *Piper methysticum* plant and the drink made by straining the roots and basal stump through water. This explanation however overlooks kava's deep cultural significance throughout much of the Pacific and Pacific diaspora, shaped by over 2,000 years of traditional knowledge (Lebot et al., 1992). Kava is not simply a plant or drink; it is arguably the Pacific's most dominant cultural keystone species (Aporosa, 2019a). It embodies both cultural form and function inclusive of utensils such as a designated wooden bowl (*tanoa* or *kumere*) from which the kava is served into *bilolipulapu*—half coconut shell cups—to attendees in hierarchical order seated on woven mats who

engage in *talanoa*, or culturally guided discussion (Fa'avaei et al., 2016). That cultural form and function underpins a central role in *veiyaloni* or *vā*; the fostering of relational bonds through shared ancestry, cultural practices, and social experience enriched by spiritual and ceremonial exchange and linguistic expression (Aporosa & Fa'avae, 2021). Furthermore, kava is understood to possess *mana*, or spiritual power, enhancing its role in both ceremonial practice and less formal occasions underpinned by culturally informed behavior standards (Aporosa, 2019a). While traditional Pacific knowledge recognizes the term *kava* as both a verb and a noun (Aporosa, 2024) and integral to Pacific identity expression, kava is gaining traction among non-Pacific users. Increasing numbers are choosing

to reflect traditionally-influenced use systems as part of social connection (see Figure 1), with some of that use intentionally aimed at improving mental health (Aporosa et al., 2025).

Research reports that for many Pacific peoples, a typical kava use session is 6 hr in duration, with each drinker consuming 3.6 L (6.33 pints) of kava beverage, which can amount to more than 5,000 mg of kavalactones (KL, some of the active chemicals in kava) in a single sitting (Aporosa, 2014). Pharmacology explains that kava contains over 20 lactones, together with flavokavains and “diverse secondary metabolome[s]” (Bian et al., 2020; Cheung et al., 2022; Sarris et al., 2012). Despite publications asserting how KL work in the body and brain, Kautu and colleagues (2017) explain there are large knowledge gaps, including “modes of action ... [and] the neurophysiological mechanisms associated with kavalactone metabolism” (p. 1, 5). This gap remains, with analytical chemists and biologists within our wider team undertaking work exploring these unknown factors specifically linked to traditionally influenced kava use.

Even at high consumption rates over many hours, users explain kava’s effects as subtle, lacking marked euphoria, inebriation, intoxication (Aporosa, 2019b; 2022), vestibular disturbance, or contributing to fall risk (Aporosa et al., 2022b). Professor of Medicine, Dr. Peter d’Abbs (1995), explains that kava does “not lead to violent behavior ... not befuddle the mind ... and can be used to stimulate ‘clear-headed’ discussions ...” (p. 169) Additionally, research is clear that frequent kava use does not lead to addiction (Aporosa, 2019b) and is statistically safer than paracetamol (Rasmussen, 2005), contributing to kavas regulation in several countries as “food” (Fink, 2024; New Zealand Government, 2015). The World Health Organization summarizes, “On balance, the weight-of-evidence from both a long history of use of kava beverage [therefore, kava as used and defined by Pacific traditional knowledge] and from the more recent research findings indicates that it is possible for kava beverage to be consumed with an acceptably low level of health risk.” (Abbott, 2016, p. 26)

Figure 1. *Mixed Ethnicity Group Drinking Kava at Fale Talanoa, Four Shells Kava Lounge, Auckland, Aotearoa New Zealand (Photographer: Todd M. Henry, 2024).*



A search of academic databases shows hundreds of peer-reviewed published works reporting “clinical trials of kava.” Most of those works commence with a statement that often reflects the comments in the earlier paragraph explaining the cultural significance and traditional use practices of kava. For instance, “kava [inferring the traditional substance and associated use practices] ... has demonstrated ...” (Hu, 2024, p. 1516). Descriptions of this nature lead the reader to assume the clinical trials being reported utilized kava in the methodology. However, an inspection of those methodologies typically show that a product made from *Piper methysticum* (i.e., extracts, tinctures and pharmacologically manufactured pills and capsules) and not kava was used. Exemplifying this is Belcaro’s (2016) review of kava clinical trials. He reports that “[m]ost of these studies used a standardized WS 1490 Kava extract formulation, which is composed of 70% kavalactones” (p. 52). Sarris and colleagues’ (2011) review of clinical trials, which sought to understand kava efficacy and safety, reports that most studies used a pill or tablet containing extracted kavalactones administered at a dose of 300–600 mg per day. Similarly, Prescott and colleagues’ (1993) clinical trial assessing body sway initially appears to have utilized kava as opposed to a product made from, or containing, *Piper methysticum*. They explain mixing their kava “using a method that approximated traditional techniques” (p. 50). However, upon further reading, they report their kava was then diluted with orange juice, which does not conform with traditional practice or comply with the definition of kava. Additionally, the participants only consumed a small amount in comparison to typical traditionally influenced settings.

Conversely, Saletu and colleagues (1989) report the use of Kavain, a single kavalactone extracted and isolated from *Piper methysticum*, in a “double-blind, placebo-controlled EEG brain mapping study,” showing this particular lactone has “a significant effect on the human central nervous (CNS)” (p. 187). While this finding is interesting, it contributes little to our understanding of kava ethnopsychopharmacology, or the effects of kava on the brain when all constituents are consumed together with the elements of *set and setting* linked to culture and practice (Aporosa, 2022). Finally, it is common for findings from studies that used *Piper methysticum*-based nutraceuticals and extracts in the methodology to be “overlaid on kava as used in naturalistic traditionally influenced settings ... incorrectly assuming effect correlation” (Aporosa, 2022, p. 22). This is not new, has been standard practice for over 30 years, and raises questions

about academic rigor and the role of kava research in feeding kava mis- and disinformation.

Kava misinformation and misunderstanding is not limited to the research space. Adding to confusion are products made from, or containing, *Piper methysticum*. New commodification’s and appropriations such as extracts, high potency “shots,” gummies, and flavored pop-culture drinks containing *Piper methysticum* are advertised on social media platforms, routinely misrepresented and mismarketed as kava, reported as containing “noble kava extract” (in the case of a new line of gummy-lollies), or advertised as “premium kava” (according to a brand of flavored “kava seltzer”). Further adding to kava misinformation and increasing confusion is the rise of establishments in the United States called kava bars. Styled on cafés or alcohol bars, these commercial venues often serve beverages made from *Piper methysticum*, marketed as kava, yet prepared and consumed in ways that bear little resemblance to traditional Pacific practices. Price (2024) reports that over 80% of U.S. kava bars also offer kratom (*Mitragyna speciosa*; also see Xie & Milton, 2023), a Southeast Asian plant with addictive, opioid-like effects, either alongside or mixed into *Piper methysticum*-based drinks (Trepany, 2025; Upton, 2025, p. 80–81). This practice not only misrepresents kava but fundamentally alters its effects. Kim (2021) for instance states that kratom is added to *Piper methysticum* beverages in kava bars to give a “euphoric hit,” a change not manifested in naturalistic kava use (Aporosa et al., 2022a). Further, clinical addiction psychiatrist Dr. Cornelieu Stanciu warns that the mixing of kratom with *Piper methysticum* creates a unique synergistic action increasing the addition potential of kratom (quoted in Carney, 2024, 19 min 55 s).

In summary, hundreds of peer-reviewed studies have used methodological inputs that bear little to no resemblance to traditional kava yet make claims implying direct applicability to kava. This conflation (combined with the commodification, appropriation and kava bar practices explained above) creates a significant research gap and widespread misunderstanding about what kava actually is. Our work has two key goals. First, to educate research and commercial communities about what can and cannot be identified as kava, including when discussing and extrapolating therapeutic impacts or risks to kava users who experience traditional usage. Here we exemplify study design from a Pacific-centric position informed by our traditional knowledge systems and include methodological

statements that define kava for the purposes of this research. As Pacific “owners” of kava, we (Pacific members of our team) assert the term *kava* refers to far more than the plant or its chemical extracts. It reflects a deeply embedded cultural construct rooted in Pacific epistemologies, use-settings, and relational systems. Second, in this study and our wider research we seek to advance kava ethnopsychopharmacology that differentiates from prior studies that claim to use kava but, in practice, rely on commodification’s and/or products containing *Piper methysticum*. We argue our research contributes to a more accurate scientific understanding of kava, one that aligns with cultural integrity, informs as to risks and benefits, and reinforces safety boundaries.

Methods

Definition of Kava for the Purposes of This Study

For this study, kava is defined not merely as the beverage produced by mixing the ground roots of *Piper methysticum* with water, nor as commercial derivatives such as extracts, capsules, or beverages containing *Piper methysticum*. These commercial forms vary in composition and safety profile and may include additives such as kratom (*Mitragyna speciosa*; Snowden, 2022; Xie & Milton, 2023). In alignment with Pacific traditional knowledge, kava is understood as a holistic cultural construct that extends beyond physical form to encompass ceremonial and relational contexts in which it is, including the practices of *talanoa*, a dialogic and relational mode of engagement that integrates physical, spiritual, ancestral, and communal dimensions consumed (Aporosa, 2019a, 2024; Lebot, 1992). The concept of *talanoa-vā* further emphasizes the spatial and temporal relationships maintained through trust, mutual understanding, and ongoing dialogue (Aporosa & Fa’avae, 2021, Fa’avae et al., 2016; Vaka et al., 2016). Accordingly, throughout this research, the term *kava* is used in its culturally grounded sense, reflecting its embeddedness in Pacific epistemologies and relational systems. Use of the term to refer solely to the plant, beverage, or its isolated chemical constituents is considered an oversimplification and misrepresentation of its traditional meaning.

Kava Preparation

The kava beverage used in the study was prepared by primary investigator AA, following the same “recipe” as that used in previous naturalistic kava use clinical trials (Aporosa et al., 2020, 2022a, 2022b). In total, 8 L (2.1 gallons) of kava was mixed using kava powder originating from Sagani in

Northern Fiji. After mixing, the 8 L of kava was poured into a *kumete*. The room where the kava was consumed during the feasibility study was organized to reflect a *faikava* space, or a traditionally influenced kava use venue, inclusive of woven mats placed on the floor in which participants sat cross-legged, consumed kava, and engaged in *talanoa*. Complying with cultural protocol and spoken in the Fijian language to acknowledge those present together with the *mana* (sacred) of the kava space, AA measured and served 100 mL of kava from the *kumete* into *bilo* (coconut shell cups, also known as *ipu*). AA guided the kava consumption protocols throughout the session to ensure compliance with kava’s holistic definition. Additionally, to maintain the naturalistic setting, AA invited colleagues and friends from the community to join the kava session. Invited individuals were served beverage kava from a separate batch to that of the two individuals taking part in the study.

Ethical Framework, Study Participants, and Human Subjects Waiver

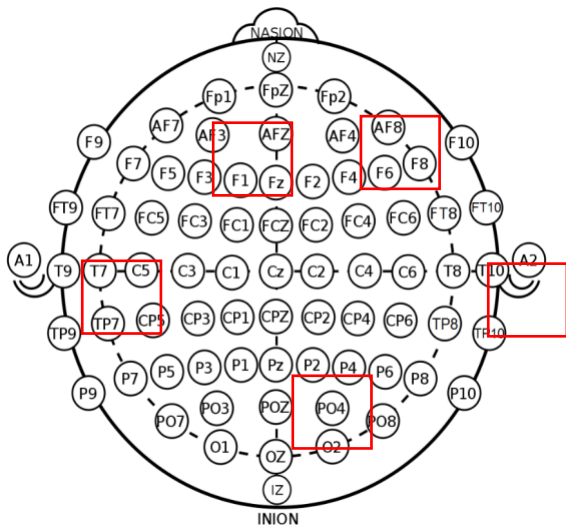
This study utilized the Pacific Post-development Methodological Framework (PPdMF), which combines the indigenous Fijian *vanua* research framework with *talanoa*, Pacific respect values and post-development theory to guide the use of Western-developed, -standardized, and -normed psychometric measures with Pacific people, in order to ensure equity and decolonize research practice (Aporosa et al., 2021). The PPdMF guided the collection of this data. The feasibility study involved only two participants: P1 and P2. Both participants are male as this is the dominant kava using gender and are regular kava consumers. Both participants are senior academic staff members at the University of Waikato, and therefore Article 5 of the Nuremberg principles, approving “self-experiments when an experiment ... [is] not expected to do harm” (Hanley et al., 2019, p. 39), was employed and ethics approval was not sought. P1, of Fijian ancestry, has been the principal investigator on several kava studies attached to this project. He has over 40 years of experience in kava preparation and consumption and the related cultural aspects, including kava consumption protocols. P2 is Aotearoa born, of English (non-Pacific) ancestry, and has been drinking kava in naturalistic settings for over 15 years.

EEG Measurement Protocol

EEG signal acquisition was performed with the Emotiv Insight device, a 5-channel wireless EEG headset. The headset was primed and placed on each participant’s head. Each electrode is placed on

the scalp according to the International 10–10 system, at five positions AF3, AF4, T7, T8, and Pz used in the study, shown below in Figure 2. The subjects were seated in a chair and closed their eyes for the duration of the test. The subjects were asked to clear their mind for 20 s. A base state EEG signal was acquired with the subject in this natural relaxed brain state. Once the optimum signal quality of 100% is attained (according to the Emotiv software) recording begins. If the signal quality drops below the threshold, the recording is deleted and repeated. An auditory cue was given to indicate to the subject that recording has begun. The recording lasts for 5 mins. Once the data has been recorded successfully there is a 2-s pause and the next recording begins. Upon acquisition, the EEG data was processed through a high-pass filter employing a Hanning window and converted to the frequency domain using a fast Fourier transform.

Figure 2. *Emotiv Insight 5-Channel Wireless EEG Headset Positions of Five Isolated Electrodes (AF3, AF4, T7, T8, and Pz) Used to Collect the Study Data. (Image: Saia et al., 2023, p. 11628).*



EEG Procedure

EEG acquisition occurred at two points during the feasibility study: prior to any kava consumption and post-kava consumption, 6 hr after the consumption of the first *bilo* of kava. The study's 6-hr duration was agreed upon to represent the period of a typical traditionally-influenced kava session. The study commenced at 10 a.m., with both participants welcomed and briefed on the procedure for the day by MO (the psychometrician). Once the baseline testing was complete, the participants were invited

to take a seat on the mats and begin consuming kava. At this point, the other individuals taking part in the kava session were invited to enter the room. The participants consumed six 100 mL serves of kava per hour, replicating typical traditionally-influenced kava consumption volumes. This equated to the participants consuming one serve every 9.5 min, with AA using a stopwatch to alert when it was time to consume their next serve.

EEG Data Visualization

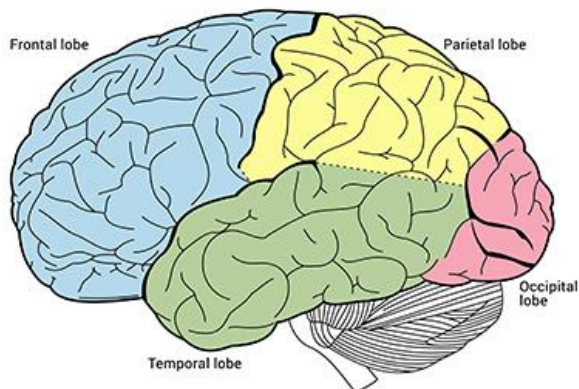
The schematic of electrode positions (presented in Figure 4) was generated in Python using the `plot_glass_brain` function from the `nilearn` neuroimaging library (v0.11.0; Nilearn contributors, 2024). A transparent glass brain template was plotted in the z-plane view, and key EEG electrode sites (AF3, AF4, T7, T8, Pz) were overlaid using MNI coordinates corresponding to the International 10–10 electrode placement system. Split semicircles indicating changes in bandpower amplitude were generated utilizing `matplotlib` (v3.10.0; Hunter, 2007).

Results

Selection of EEG Placement and Target Brain Wave Activity Assessment

The feasibility study involved small-scale acquisition of EEG signals from five locations on the scalp of two participants. The study aimed to investigate whether there is an observable difference in brain state before and after kava consumption, specifically within a naturalistic kava use test setting. Figure 3 shows a schematic of the human brain, and we describe electrode placement in *Methods*. EEG electrodes were strategically positioned to acquire electrical brain activity data over the frontal lobe (electrodes in AF3 and AF4), parietal lobe (Pz), and temporal lobe (T7 and T8). The frontal lobe houses the frontal association cortex (prefrontal cortex and the motor-related areas excluding the primary motor cortex [see Figure 3]). The frontal association complex is involved in the planning of actions and movement (executive function) as well as abstract thought. The temporal lobe is responsible for processing sensory information and helps in recognising language and forming memories. The parietal lobe is responsible for sensory information, including touch, temperature, pressure and pain.

Of particular interest to this study is the EEG signal acquired from the above-mentioned lobes of the brain. This study targeted the following five frequency bands within the EEG signal. Theta θ (4–8 Hz), alpha α (8–12 Hz), low beta β (12–16 Hz),

Figure 3. Brain Schematic.

Note. Showing division of each of the hemispheres into four lobes: frontal, parietal, temporal and occipital (University of Queensland, 2024).

high beta β (16–25 Hz), and gamma γ (25–45 Hz). Alpha α waves connect conscious thinking and subconscious mind and are associated with calming and relaxation. Alpha waves in healthy, awake adults occur while resting with the eyes closed. They disappear during sleep and when there is concentration on a specific task. Alpha waves are maximal over the occipital region. Beta β waves replace alpha waves during attention to tasks or stimuli and are of higher frequency. They are common while concentrating, or when a person is under stress or experiencing psychological tension. If a patient opens their eyes or begins a mental activity, the alpha waves decrease to be replaced by beta waves all over the scalp. Low beta β waves are active in a waking state. They are involved in conscious thought and logical thinking and tend to have a stimulating effect. High beta β is associated with significant stress, anxiety, paranoia, high energy, and high arousal. Theta θ waves are involved in sleep or daydreaming. These waves tend to be more dominant in deeply relaxed or meditative states. Theta waves in normal adults may appear transiently during sleep. Gamma γ waves are important for learning, memory, and information processing. They are produced when intensely focused or actively engaged in solving a problem.

EEG Measurement Data

This preliminary study analyzed EEG to assess neurophysiological changes before and after kava consumption. Figure 4 provides a visual summary of the EEG data obtained from both participants. After kava consumption, Participant 1 showed a decrease in α and θ waves, while γ waves increase compared to baseline. Low and high β exhibit only minor

changes and do not show a clear directional trend. After kava consumption, Participant 2 shows a notable increase in α waves and an increase in θ waves after kava consumption. Small increases also occur in both low and high β , while γ waves decrease relative to baseline. Table summaries of pre- and post-kava values for each electrode (AF3, AF4, T7, T8, and Pz) can be found in Appendix A. In brief, the largest shifts for both participants appear in the frontal (AF3, AF4) and temporal (T7, T8) electrode sites, with additional changes at the parietal site (Pz).

Discussion

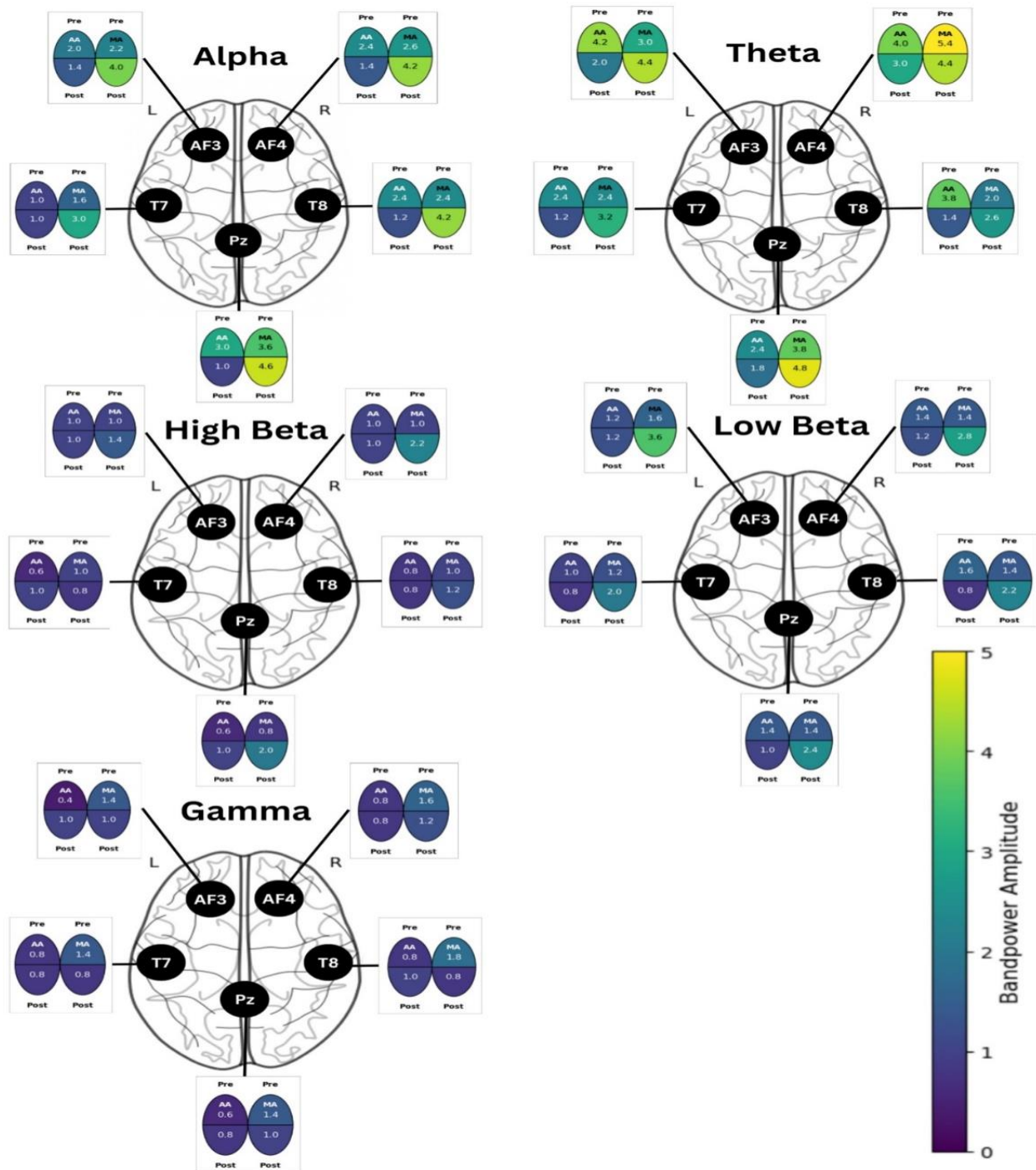
Neurophysiological Activity Similarities and Contrasts Between Participants

Participants exhibited contrasting EEG responses following kava consumption, with each participant showing almost opposite effects. Participant 1 showed a decrease in α and θ waves while γ increased, indicating an active mind and heightened focus (Herrmann et al., 2005; Jensen et al., 2007). Reductions in α and θ may suggest a move away from relaxation and introspection toward greater attentional engagement, consistent with higher γ power being associated with integrative processing (Fries, 2001). Although low and high β showed minor shifts, they did not display a clear directional trend (Niedermeyer, 2011). In the case of Participant 2, there was a considerable increase in the presence of α waves, suggesting an enhanced connection between conscious and subconscious processes and a calmer, more relaxed state (Cahn & Polich, 2006). This was further supported by a noticeable increase in θ waves, which are often linked to sleep or daydreaming and are dominant when a person is deeply relaxed or meditative (Başar et al., 1999; Klimesch, 1999).

Participant 2 also displayed small increases in both low and high β , possibly reflecting mild cognitive stimulation, while γ decreased. A reduction in γ waves may imply diminished focused engagement or reduced information processing (Basar-Eroglu et al., 1996).

It is suggested that additional electrode-level examination be conducted, given that activity at AF3 and AF4—positioned above the frontal lobe—is associated with planning, decision making, and behavioral control (Fuster, 2017). For Participant 2, AF3 showed increases in most frequency bands except γ , while AF4 displayed decreases in γ and θ alongside increases in other bands, indicative of a

Figure 4. Changes in EEG Bandpower Amplitude Across Five Frequency Bands (Alpha, Theta, High Beta, Low Beta, and Gamma) Before and After Kava Consumption.



Note. Topographic head maps illustrate the location of key electrode sites (AF3, AF4, T7, T8, Pz), with surrounding oval plots showing pre- (upper) and post- (lower) kava mean bandpower amplitudes for each site in the two participants (P1, left and P2, right). The color scale represents normalized bandpower amplitude from 0 (purple) to 5 (yellow). Notable post-kava increases in alpha and theta bandpower are observed particularly in frontal and parietal regions, consistent with relaxation and sedative effects. High and low beta bands show reduced or unchanged activity, while gamma activity remains low across conditions. These spectral changes reflect a shift toward a calmer, less aroused neural state following kava intake.

relaxation-related profile. Conversely, Participant 1 presented decreased α and θ and increased γ at both AF3 and AF4, suggesting enhanced executive functioning and focus. Temporal (T7, T8) and parietal (Pz) sites also displayed shifts, though to varying extents (Kropotov, 2016).

We also considered these EEG findings in light of our published *Brain Gauge* study which reported kava use as having a statistically significant detrimentally effect on temporal order judgment (TOJ), a cognitive function associated with frontal–striatal circuits (Aporosa et al., 2022a). The heightened γ in Participant 1 could theoretically improve TOJ (Pöppel, 1997; van Wassenhove et al., 2007), whereas the lower γ in Participant 2 might hinder it. From a physiological perspective, the observed alterations in EEG band power could reflect underlying changes in cortical excitability and network connectivity. Increased α and θ power—as seen in Participant 2—are often associated with inhibitory neural processes and a state of relaxed introspection, potentially mediated by enhanced GABAergic activity (Başar et al., 1999; Klimesch, 1999). In contrast, the increased γ band activity observed in Participant 1 is typically linked with local cortical processing and integrative functions that support rapid information processing (Fries et al., 2001; Jensen et al., 2007), which may facilitate the precise temporal sequencing required for optimal TOJ performance (Pöppel, 1997; van Wassenhove et al., 2007). These divergent patterns underscore the possibility that individual differences, perhaps due to habitual kava use or cultural background, may modulate the balance between relaxation and cognitive alertness during kava consumption. Future studies that include behavioral assessments of TOJ alongside EEG measures would help clarify the neurophysiological mechanisms at play.

Implications of Participants' Contrasting EEG Measurements

Even within this small sample, the distinct EEG outcomes highlight the importance of individual variability and justify more extensive research. By demonstrating that both relaxation-oriented and focus-oriented neurophysiological profiles can emerge under kava consumption, these results emphasize the complexity of kava's ethnopharmacology. Larger studies with direct behavioral measures—such as TOJ tasks—are needed to confirm the extent to which these EEG patterns predict functional outcomes. Ultimately, exploring these mechanisms more deeply will not only clarify kava's effects on brain function but also

support its culturally informed and safe application in traditional and contemporary contexts.

Individual differences that may underlie these divergent outcomes create the pressing need for wider, demographically stratified and fully historied study cohorts. Confounding effects of age, sex, genetics, metabolism and pharmacodynamics, health conditions, and kava use history (length, practice, habituation) will need to be assessed. Ultimately, application of exciting new techniques such as machine learning to data from an at-scale study could provide consumers and regulators with much-needed data on individual features associated with different outcomes of kava use. From a regulatory perspective, this type of data set on traditional kava use would then set a standard for the knowledge base, standing in contrast to abstracted and adulterated products containing *Piper methysticum* that, while market and presented as kava, has little in common with the Pacific cultural keystone species.

Implications for Kava Misinformation and Disinformation

This study develops and implements a proposed best practice for defining kava when used in research, and potentially in commercial settings. The traditional and naturalistic definition of kava used here is combined with the long-term goal of addressing research gaps on kava exposure that has fidelity to the traditional practice. Together, these have the potential to support a best practice benchmarking that (a) limits the definition (and claim) of kava to its Pacific-centric and culturally-authentic self, and (b) creates a way for consumers, practitioners, and regulators to clearly differentiate when they are presented with information on *Piper methysticum*-derived products that are not kava per se. There are significant implications here for wider societal understanding of kava outside the cultural and research communities.

For example, using the term *kava* to describe only the plant, its derivatives, or *Piper methysticum*-containing products and practices in many kava bars is a reductionist misrepresentation that not only distorts kava's traditional meaning but also misrepresents kava to customers. In the U.S., false advertising is considered a “deceptive trade practice” and, in some cases, counters regulations including the 2004 Federal Trade Commission Act. Similarly, Critchfield et al. (2023) observe that kratom's availability in venues called kava bars reinforces the mistaken idea that the two are similar. The FDA reports 36 deaths linked to kratom-

containing products (Gottlieb, 2018), and “has determined that kratom, when added to food, is an unsafe food additive,” adding that “kratom is not lawfully marketed as a dietary supplement and cannot be lawfully added to conventional foods” (FDA, 2025). Kratom (unlike kava) is concerning in terms of health effects and addictive potential (Carney, 2024; Towers et al., 2026). Heaton (2025) warns that U.S. kava bars serving *Piper methysticum* beverages “laced with ... kratom” has raised concern among Pacific kava advocates who fear that kava will be wrongly blamed for kratom-related harms. Vanuatu’s Biosecurity Director, Tekon Timothy Tumukon (2024), has warned that U.S. establishments are misleading consumers by marketing kratom-kava blends as “fresh kava.” He proposes that such products be rebranded to avoid confusion and to prevent another global ban on kava exports, referring to the *European Kava Ban* of the early 2000s in which nutraceuticals and products containing *Piper methysticum* were believed responsible for hepatotoxicity cases and several deaths (Showman et al., 2015). Kava-kratom confusion (misinformation [Peifer, 2024]) and deliberate conflation (disinformation [Lewis, 2024]) has extended to regulatory bodies, the media, and financial institutions. Tumukon’s comment has merit, particularly as many commercial products containing *Piper methysticum* are advertised as kava, appropriate the safety profile of the traditionally prepared beverage in their advertising, and imply that this applies equally to their own formulations. Advertisements also highlight, or allude to, kava’s cultural significance, calming and sleep-promoting properties, inaccurately suggesting correlation between kava and their commercial commodifications.

Conclusions

This study contributes to the nascent field of kava ethnopsychopharmacology by demonstrating that even within a small sample, individual variability in EEG responses is evident. Moving forward, it is essential to replicate these findings in larger cohorts and to incorporate direct behavioral assessments to validate the relationship between EEG dynamics and cognitive performance. Such efforts will not only deepen our understanding of the neurophysiological mechanisms underlying kava’s effects but will also inform the safe and culturally relevant application of kava in both traditional and contemporary contexts.

There are cultural, academic, community, commercial, and regulatory stakeholders within the kava ecosystem, all of whom are negatively

impacted by the aforementioned confusion and conflation of safe kava with commodified and appropriated products containing *Piper methysticum*—some of which include addictive kratom—that are inconsistent with traditional knowledge definitions of kava. We propose the establishment of a research definition, methodological framework, and evidence base that starts with traditional kava use and is supplemented by work on the abstracted and adulterated forms, rather than vice versa. This will bring increased clarity extending from culture to academia and radiating out into community, commerce, and society as a lens through which decision-making on kava at the personal and institutional level can be better informed.

By advancing research that centers on culturally defined kava and employs traditional preparation and use-settings, we seek to provide a clearer, more accurate understanding of kava’s cognitive, neurological, and relational effects. Rigorous, culturally grounded research is essential, not only to safeguard kava’s integrity and the communities that steward it but also to ensure that health claims and regulatory frameworks are informed by evidence that accurately reflects kava as it is known, used, and experienced in the Pacific—kava that is also increasing in popularity among non-Pacific peoples seeking to genuinely engage with both this cultural keystone species and its relational space.

Author Declarations

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Appendix A

Table A1*Table Values Reported as Normalized Arbitrary Units*

Participant 1	Theta	Alpha	Low Beta	High Beta	Gamma
Pre					
AF3	4.2	2.0	1.2	1.0	0.4
T7	2.4	1.0	1.0	0.6	0.8
Pz	2.4	3.0	1.4	0.6	0.6
T8	3.8	2.4	1.6	0.8	0.8
AF4	4.0	2.4	1.4	1.0	0.8
Post					
AF3	2.0	1.4	1.2	1.0	1.0
T7	1.2	1.0	0.8	1.0	0.8
Pz	1.8	1.0	1.0	1.0	0.8
T8	1.4	1.2	0.8	0.8	1.0
AF4	3.0	1.4	1.2	1.0	0.8
Participant 2	Theta	Alpha	Low Beta	High Beta	Gamma
Pre					
AF3	3.0	2.2	1.6	1.0	1.4
T7	2.4	1.6	1.2	1.0	1.4
Pz	3.8	3.6	1.4	0.8	1.4
T8	2.0	2.4	1.4	1.0	1.8
AF4	5.4	2.6	1.4	1.0	1.6
Post					
AF3	4.4	4.0	3.6	1.4	1.0
T7	3.2	3.0	2.0	0.8	0.8
Pz	4.8	4.6	2.4	2.0	1.0
T8	2.6	4.2	2.2	1.2	0.8
AF4	4.4	4.2	2.8	2.2	1.2